INTERACTION EQUATION VALUES FOR WOOD TRUSS COMPRESSION CHORDS CONSIDERING THE EFFECTS OF PARTIAL COMPOSITE ACTION

APPROVED:

INTERACTION EQUATION VALUES FOR WOOD TRUSS COMPRESSION CHORDS CONSIDERING THE EFFECTS OF PARTIAL COMPOSITE ACTION

By

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REPORT

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ABSTRACT

INTERACTION EQUATION VALUES FOR WOOD TRUSS COMPRESSION CHORDS CONSIDERING THE EFFECTS OF PARTIAL COMPOSITE ACTION

By

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A finite element, planar frame analysis is used in this study to analyze top chord (composite) members of common truss which have two layers fastened by flexible connections. A parametric study was conducted using the computer program LTRUSS (Layered TRUSS) to determine the effects of wood sheathing on the top chord members of wood trusses.

This study is directed at determining the appropriateness of the 1986 National Design Specification for Wood Construction equation which allows for beam-columns to incorporate the effects of the attached sheathing and to provide information to allow for a more rational approach to account for the sheathing.

Results of this study show that the current design provisions do not adequately account for the reduction of stresses realized in the composite members. The theoretically exact interaction equation for the beam-columns

indicates that the loads allowed could sometimes be as great as four times what is currently allowed. Additionally, results show that truss span, connector spacing and stiffness, truss member dimensions, sheathing effective area and modulus of elasticity, and truss pitch all should be included in any equation to adequately represent the actual stiffness gained by the composite member.

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CHAPTER 1

INTRODUCTION

1.1 Background

Light frame wood trusses are one of the most common structural elements in the light frame market. A reasonable estimate would say that over 80 percent of all new residential construction uses metal plate-connected roof trusses[1]. Typically, these trusses are spaced either 16 in. or 24 in. on center and they have spans which are generally less than 50 feet. Attached to the top of the top chord of the truss, generally, is a sheathing layer which is used to transfer the loads to the trusses and to share in carrying some of the load. This sheathing is usually nailed to the top chord of the truss, which provides for some composite action of the two materials. However, due to the fact that the sheathing and the top chord are not rigidly connected--because of the finite stiffness of the nail in single shear-the sheathing and lumber cannot be considered to be a complete composite member. This increases the difficulty in quantifying the increased stiffness of the chord member, and therefore the entire truss, due to the presence of the sheathing.

One method of accounting for the additional stiffness provided is the use of a buckling stiffness factor, C_T, which is explained by the National Design Specification for Wood Construction [5]. This factor is applied to the modulus

of elasticity, E, in the calculation of the value "K" (used to determine whether a column is short, intermediate or long) and the design compression stress parallel to the grain (F'_c). One of the criticisms of this factor is its limited range of application. It may only be applied to visually graded 2 x 4 chords which have $^3/_8$ - in. thick or thicker plywood nailed directly to the narrow face of the chord. Additionally, the member must be subject to both flexure and compression and dry conditions are essential. This factor, ultimately, is used to increase the maximum allowable compressive stress of the member, which in turn, reduces the value for the interaction equation used to check members that are in flexure and compression. Another limitation of the buckling stiffness factor is its failure to account for the influence of the sheathing on the flexural stresses felt by the member and what factors increase or decrease the effect that the sheathing has on the compressive and flexural stresses.

Through the use of the planar frame computer analysis program LTRUSS, which incorporates a stiffness relationship for layered members with partial composite action, an improved understanding of the composite effects in the layered members may be realized. With a better understanding of the composite effects of layered members, a more rational approach to designing trusses may be found. This would be a benefit considering the tremendous use of light-frame wood trusses in the residential market as well as other markets.

1.2 Objective and Scope

The objective of this research is to quantify the influence of sheathing on the 1986 NDS design interaction equation values for top chord members of common wood trusses and to determine the appropriateness of the current design provisions. Stresses in wood truss members with sheathing attached are determined through use of an eight degree-of-freedom, one dimensional finite element. The element stiffness matrix for these composite members was incorporated into the planar frame analysis program LTRUSS [4]. LTRUSS calculated stresses for each truss studied by way of two separate analyses. The first analysis included the effect of the partial composite action between the solid wood member and the sheathing, and the second analysis was a conventional analysis considering the wood members only.

From the stresses calculated by LTRUSS, the interaction equation for beam-columns was calculated. This study shows the relationship of the stresses present in the members and its relationship to how the design interaction equation value is changed. A total of six commonly used light-frame wood truss configurations were studied while varying the span length, pitch, material properties, material sizes and connector spacing.

1.3 Literature Review

A significant amount of research has been undertaken in the past regarding the behavior of structural systems including the effects of sheathing. Two of these works dealt directly with the linear analysis of wood trusses which had sheathing attached. These are Seif, Vanderbilt, and Goodman [7] and Warner and Wheat [8]. A brief overview of these two works follows.

Seif, et al. attempted to develop an analytical procedure for analyzing planar metal plate-connected trusses including the effects of the composite behavior of the layered members and the flexible behavior of the metal joints where the web members intersect with the chords. For the two-layered composite members, an eight degree-of-freedom finite element was developed. Of these eight degrees of freedom, six were for the solid wood: axial, transverse, and rotational displacements at each end. Two degrees of freedom were for the axial displacement at each end of the sheathing. This analysis procedure divided each member into between 12 and 21 elements and then used static condensation to obtain a 6 x 6 member stiffness matrix.

From Seif, et al. it was concluded that composite behavior had a noticeable effect on the maximum stresses and deflections for several truss types. These results appeared to correspond in a favorable manner with previous experimental results, including that of Goodman [3] and Newmark, et al. [6].

The approach by Warner and Wheat relied on the derivation of the governing differential equations for two-layered beams by Newmark, Siess, and Viest [6] by using the method of consistent deformations to derive member stiffness matrices as well as fixed-end actions for two-layered members. In this approach there was no need to subdivide the members into smaller elements, thereby eliminating the need for static condensation.

Building upon these studies, Jerrett [4] developed a computer program LTRUSS (Layered TRUSS) in order to better understand the effects of sheathing on truss member stresses. These results confirmed that plywood sheathing attached to wood truss members reduced the maximum axial and bending stresses in truss solid chord members.

CHAPTER 2

LAYERED BEAM ANALYSIS

2.1 Introduction

The analysis used to determine the stresses in the member including the effects of sheathing was developed by Jerrett [4]. His program, LTRUSS, was developed to establish the differences between the tensile, compressive, and bending stresses for both non-layered and layered analysis. The program was slightly modified to provide the output necessary for this study. The complete details of the stiffness matrix of the composite member which is used in this study is beyond the scope of this report. However, the basic underlying approach as developed by Calixto and Wheat [2] has not been changed.

2.2 Description and Assumptions

If a two-layered member of linear elastic material, in which there is no composite action, is subjected to bending, then the lower fibers will lengthen and the top fibers will shorten in each layer. This lengthening and shortening is linear within each of the layers relative to its distance from its respective neutral axis.

If the same two members fastened in some manner, then interaction occurs at the layer interface which influences the strains in the layers. The amount of lengthening and shortening in the top and bottom layers then depends on the

degree of composite action, or the connector stiffness acting along the layer interface. As the connector stiffness increases, slip of the fibers at the connection decreases and the horizontal shear stresses increase. If a connector stiffness of sufficient strength were determined to allow no slip at the interface, then the member would act as a composite member.

Similarly, this interface influences the actual stresses felt due to an axial load. If partial composite action is present between two members, and only one member is under an axial load, the other member will also undergo some axial strain.

The element which is used to model the truss members of this study is shown in Fig. 2.1. This element has eight degrees of freedom (DOF), where DOF 1 and 5 are the axial DOF for the sheathing; DOF 2, 3, and 4 are the axial, transverse, and rotation DOF's for the left end of the truss member, respectively; and DOF 6, 7, and 8 are the respective axial, transverse and rotation for the right end of the truss member. Figure 2.1 shows all the degrees of freedom in the positive direction.

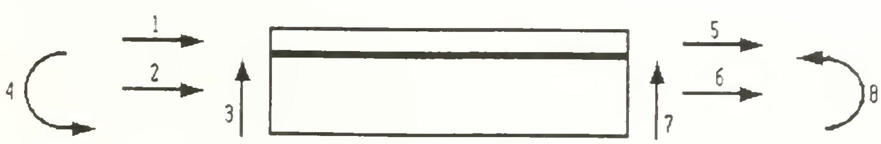


Fig. 2.1 Layered Beam Element

A complete description of the development of the stiffness matrix used in this analysis is contained in Calixto and Wheat [2] and will not be detailed in this report. However, the following is a summary of the assumptions made:

(1) The load deformation relationship (or load-slip relationship) for the connector was assumed to be linear.

(2) The shear connection between the sheathing and the truss member is considered to be continuous along the length of the member.

(3) Plane sections remain plane within layers.

(4) Both layers are assumed to deflect equally in the transverse direction and deflections were finite.

(5) Shear deformations are neglected.

(6) Member joints are either completely rigid or pinned.

(7) The friction between the layers is disregarded.

2.3 Analysis Procedure

Conducting the analyses for this study was a two-step process. The first step used the computer program LTRUSS [4]. The second step took the data received from the LTRUSS analysis and through the use of many spreadsheets calculated the four interaction equation values for each analysis. A brief flow chart of the analysis is contained on the following two pages.

ANALYSIS OF TRUSS AND DETERMINATION OF INTERACTION EQUATION VALUES

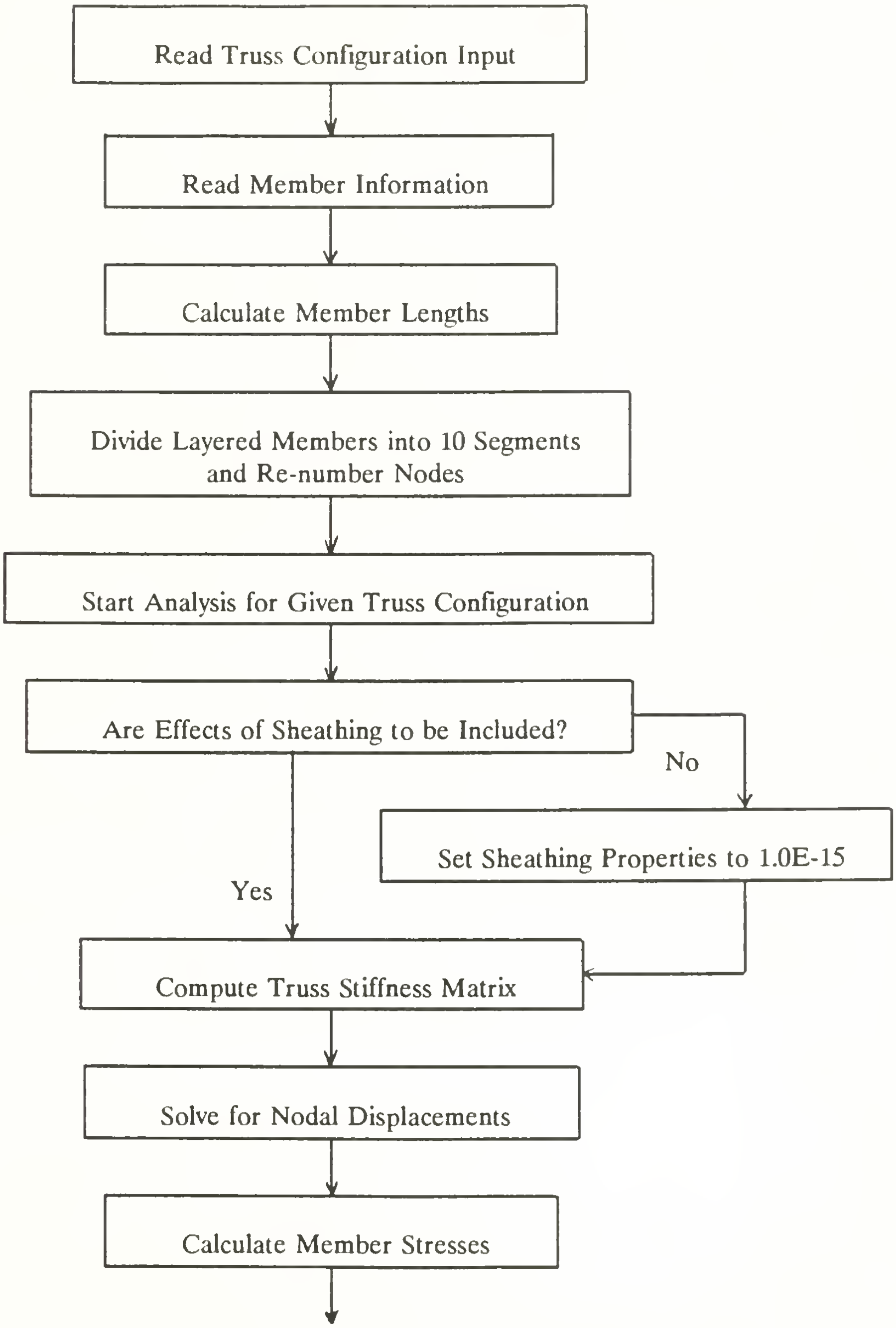


Figure 2.2

ANALYSIS OF TRUSS AND DETERMINATION OF INTERACTION EQUATION VALUES(cont.)

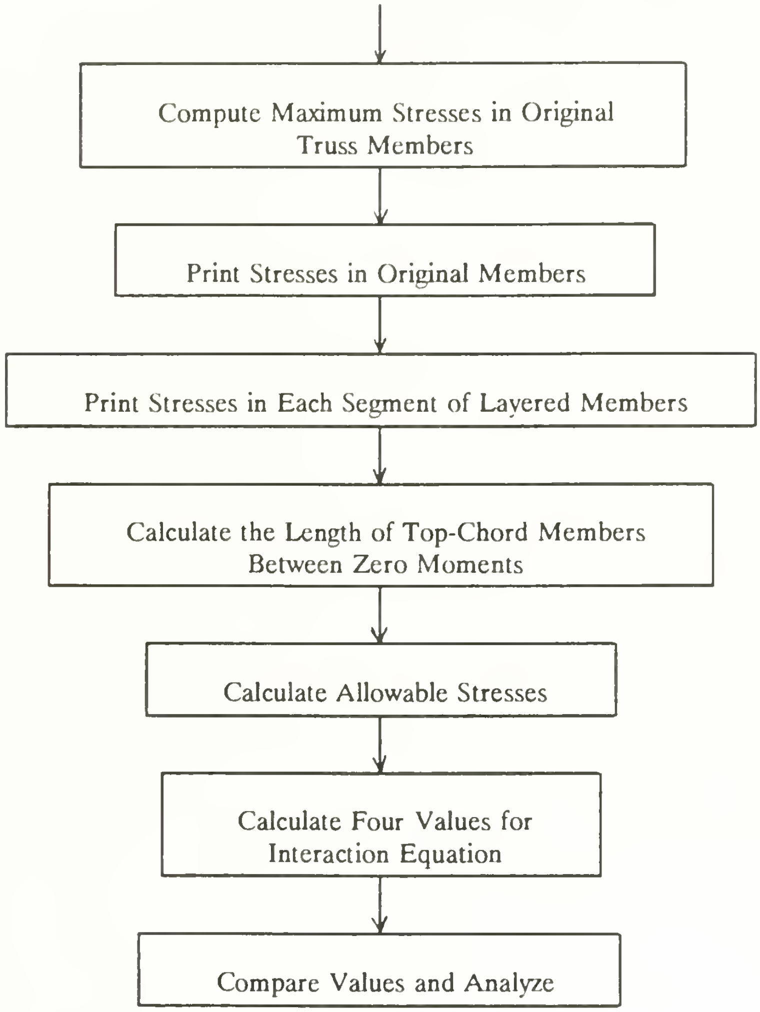


Figure 2.2 (cont.)

The majority of the steps shown were part of the program LTRUSS. A detailed explanation of LTRUSS is available elsewhere [4] and therefore will not be made here. The major item to note for this study from LTRUSS is the division of all layered members into segments. Throughout this research, layered members were subdivided into ten segments (the number of segments may vary depending on the capability of the computer you are working with). The purpose of this division was to allow the program to calculate stresses at intermediate points within the layered member. Then, the stresses within each segment that made up a layered member were compared, and the maximum axial and bending stresses were determined. These were the stresses used to determine all of the interaction equation values, with the exception of the "Exact Maximum IEV." To determine this value, the stresses in each segment of the layered member were output and these stresses were used to calculate an interaction equation value at the eleven new nodes of the original layered member. The maximum value from these eleven nodes became the "Exact Maximum IEV."

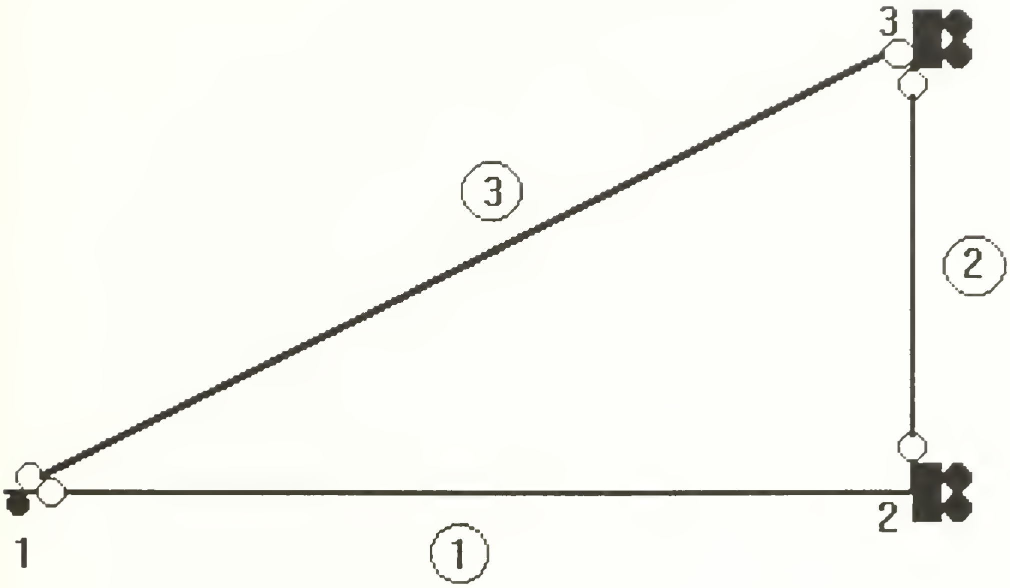
CHAPTER 3

PARAMETRIC STUDIES

3.1 Introduction

The results of the entire study investigating the impact of nine variables on the effectiveness of the plywood sheathing on the truss members are set forth in this chapter. This effectiveness is presented in both graphical and tabular form and is shown as a factor of how interaction equation values are reduced. The variables which were investigated were: truss configuration, truss span, truss pitch, truss member modulus of elasticity, sheathing dimensions, connector spacing, sheathing modulus of elasticity, and truss member dimensions. Every attempt was made to select a range for each variable so as to accurately reflect truss properties commonly used in the industry.

Truss configuration was considered by using six separate commonly-used trusses and considering the effect on each top chord member. The six different truss configurations are shown in Fig. 3.1 through Fig. 3.6. These figures show only half of the truss since they are symmetric about the vertical axis at the ridge. Member and node numbers are shown. Panel points were set equally spaced along the bottom and top chords. The span parameter considered the truss length and each truss was analyzed for lengths such that the number of top chord members divided by the span was 5.0, 7.5, and 10.0. Pitch of the truss was



DISPLACEMENT FIXED IN THE
VERTICAL DIRECTION

ROTATIONS FIXED AND
DISPLACEMENTS FIXED IN THE
HORIZONTAL DIRECTION

Fig. 3.1 TRUSS 1

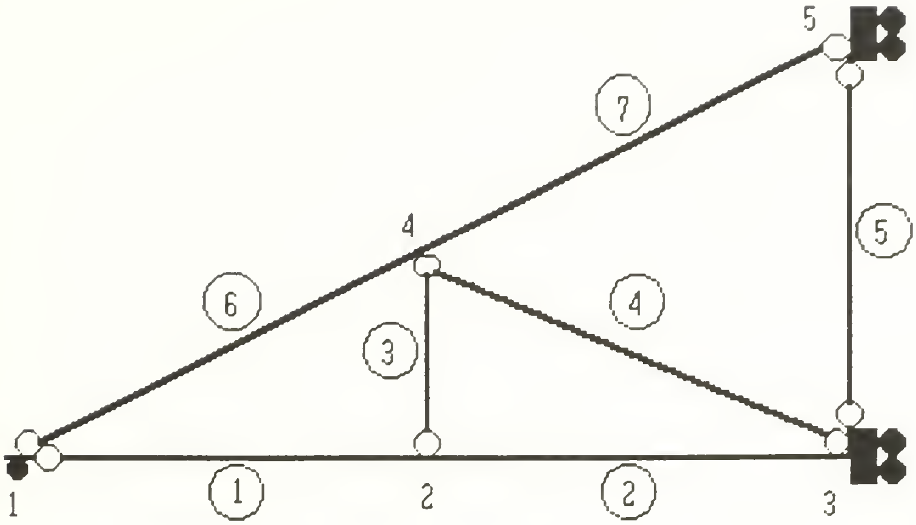


Fig. 3.2 TRUSS 2

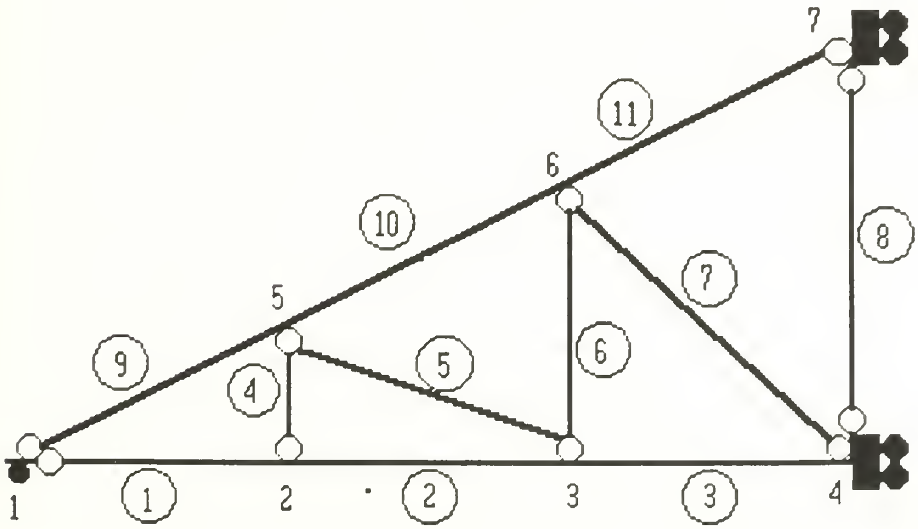


Fig. 3.3 TRUSS 3

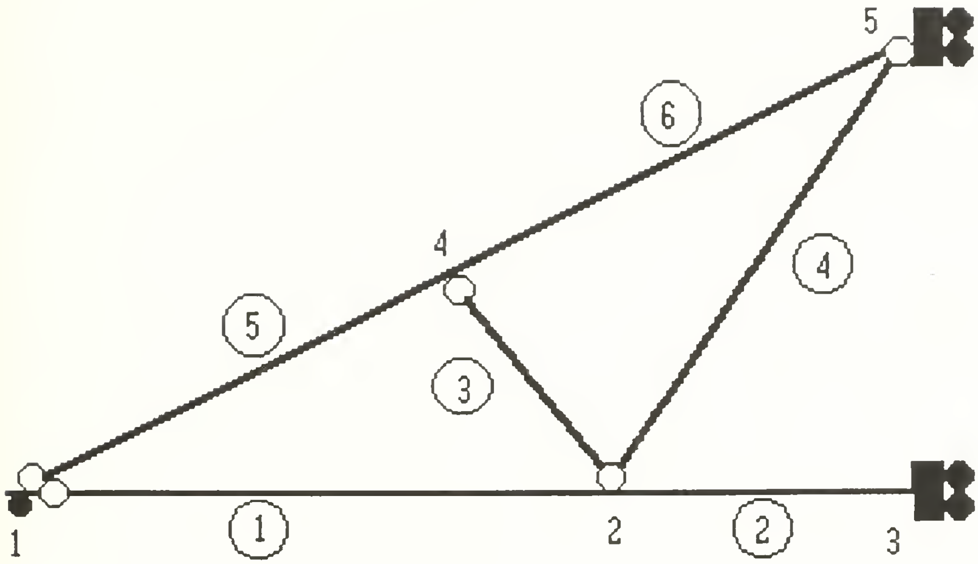


Fig. 3.4 TRUSS 4

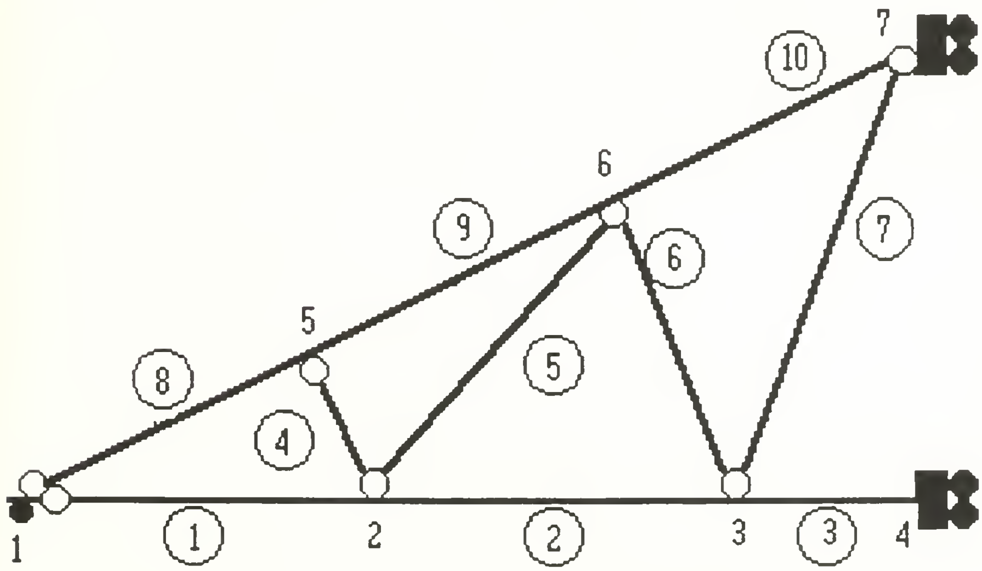


Fig. 3.5 TRUSS 5

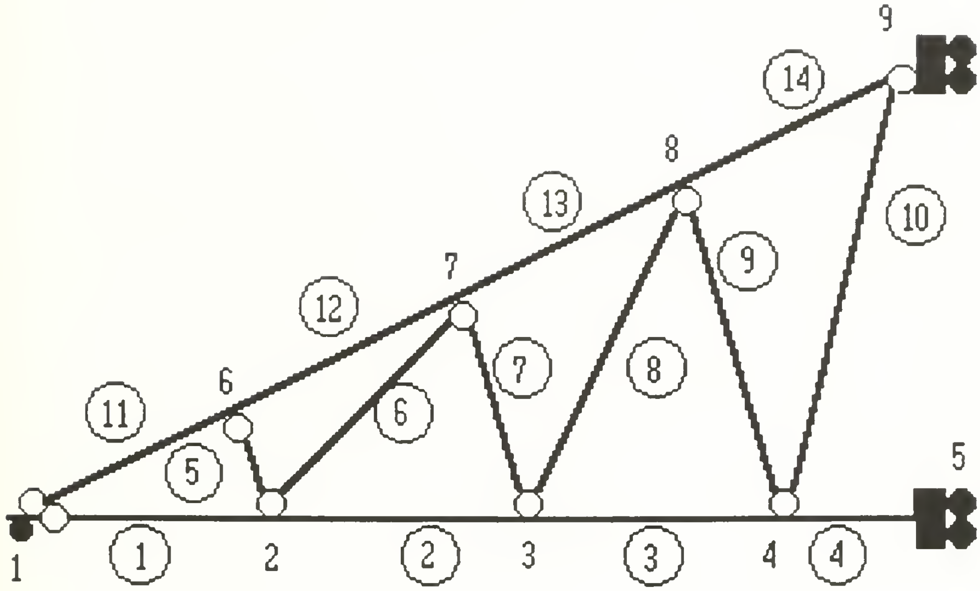


Fig. 3.6 TRUSS 6

studied by varying the slope of the top truss chord between four inches per foot and twelve inches per foot. The sheathing dimension parameter was considered by varying the sheathing cross-sectional area and the effective moment of inertia of the sheathing. The modulus of elasticity for the sheathing and for the truss members were considered separately as was the spacing of the sheathing connectors. Finally, the truss member dimensions were changed to study its effect on the stiffness gained by the sheathing.

Typically, the wood truss members analyzed were considered as standard nominal 2 x 4 members (1.5 inches x 3.5 inches) with the narrow face attached to the sheathing. However, for the last parameter, truss members were considered as 2 x 4, 2 x 6, and 2 x 8 nominal members. The loading for each truss was selected as 30 pounds per linear foot acting vertically along all top chord members. The complete categorization of the parameters studied is shown in Table 3.1.

The trusses were modeled as having continuous top and bottom chords. The top chord was modeled as pin-connected at the vertical support and at the peak. The bottom chord was modeled as pin-connected at the vertical support also. Sheathing was considered to be continuous along the top chord. The web members were considered as pin-jointed members attached to the chords. The supports were considered in the vertical direction at the outer nodes and in the

TABLE 3.1 PARAMETRIC VALUES

VARIABLE	TRUSS	SPAN (ft)	PITCH (/12)	MEMBER E (ksi)	SHEATHING AREA (in**2)	SHEATHING I (in**4)	SHEATHING E (ksi)	S (in)	Member Sizes
Span	1	10,15,20		1600 for					
	2,4	20,30,40	6	chords;	3.0	0.064	1500	6	2 x 4
	3,5	30,45,60		1400 for					
	6	40,60,80		webs					
Pitch	1	15		1600 for					
	2,4	30	(4,6,8,	chords;	3.0	0.064	1500	6	2 x 4
	3,5	45	10,12)	1400 for					
	6	60		webs					
Chord	1	15		1200, 1400,					
Modulus of	2,4	30	6	1600, 1800;	3.0	0.064	1500	6	2 x 4
Elasticity	3,5	45		for chords					
	6	60		webs less 200					
Sheathing	1	15		1600 for					
Area	2,4	30	6	chords;	(3.0,4.0,	0.064	1500	6	2 x 4
	3,5	45		1400 for	5.0,6.0)				
	6	60		webs					

TABLE 3.1 PARAMETRIC VALUES (cont.)

VARIABLE	TRUSS	SPAN (ft)	PITCH (/12)	MEMBER E (ksi)	SHEATHING AREA (in**2)	SHEATHING I (in**4)	SHEATHING E (ksi)	S (in)	Member Sizes
Sheathing Effective Moment of Inertia	1 2,4 3,5 6	15 30 45 60	6	1600 for chords; 1400 for webs	3.0	(0.016,0.032, 0.064,0.096)	1500	6	2 x 4
Sheathing Modulus of Elasticity	1 2,4 3,5 6	15 30 45 60	6	1600 for chords; 1400 for webs	3.0	0.064	(1300,1500, 1700,1900)	6	2 x 4
Nail Spacing	1 2,4 3,5 6	15 30 45 60	6	1600 for chords; 1400 for webs	3.0	0.064	1500	(3,6, 9,12)	2 x 4
Member Size	1 2,4 3,5 6	15 30 45 60	6	1600 for chords; 1400 for webs	3.0	0.064	1500	6	(2 x 4, 2 x 6, 2 x 8)

horizontal direction at nodes along the center line of the truss. Along the center line of the truss, the rotations were also fixed to zero in the bottom chord.

3.2 Results

In 1986 NDS design procedures for beam columns, the governing interaction equation consists of an axial part and a flexural part. Members subjected to both flexure and axial compression are proportioned by the equation:

$$\frac{f_c}{F_c'} + \frac{f_b}{F_b' - Jf_c} \leq 1.0 \qquad \text{(Eq. 1)}$$

The terms in the above equation are defined as:

f_c -- the actual unit stress in compression parallel to grain induced by an axial load, in pounds per square inch (psi).

F_c' -- the design value in compression parallel to grain, adjusted for the l_e/d ratio, psi.

f_b -- the actual unit stress at extreme fiber in bending, psi.

F_b' -- the design value for extreme fiber in bending, adjusted by the slenderness factor, psi.

J -- a unitless convenience factor defined as shown below:

$$J = \frac{(l_e/d) - 11}{K - 11}$$

where K = the smallest slenderness ratio (l_e/d) at which the long column formula applies for determining the design value in compression parallel to grain.

Typical design of top chord truss members would use the above interaction equation for determining the safe loads which can be carried or the size or spacing of the trusses.

The stresses used in Eq. 1 (IE) are usually determined neglecting the additional stiffness provided by the sheathing. Then, using these "without sheathing" stresses, the 1986 National Design Specifications for Wood Construction (NDS) [5], allows an additional stiffness factor to be used to account for the increased strength provided by the sheathing. This factor, the buckling stiffness factor, C_T , is a factor of the modulus of elasticity, E, and the effective buckling length used in the design of the top for compression loading. C_T is then multiplied into the equations used to determine F_c', the design value in compression parallel to grain.

In Jerrett's work [4], the effects of the sheathing on the axial and flexural stresses in the chord members were reported. The results of this research have incorporated the reduced stresses, corresponding to the inclusion of sheathing stiffness in the analysis, into the design interaction equation value.

Each truss was analyzed twice for the given load. The first analysis considered the properties of the truss members alone, assuming no sheathing was present; the second analysis included the effects of the sheathing. From the analytically-predicted stresses obtained from the two separate analyses, four values were calculated for the "Design Interaction Equation Value."

The tabular results of this analysis are shown in the Appendix in Tables A.1 through A.6. In these tables the first Interaction Equation Value (IEV) was calculated from the analysis neglecting sheathing. This value was used as the *base* value to which all other calculated values were compared. This was considered as the *base* value because this is the method of truss analysis most often used in design practice [1]. The next Interaction Equation Value computed is referred to as the "IEV Including use of C_T." This value represents the value of the interaction equation which would be derived using the stresses calculated neglecting sheathing and then using the allowed buckling stiffness factor, C_T, from Section 3.10.5 of National Design Specifications for Wood Construction [5]. Thus, this is currently the value given by the code to account for the stiffness gained with the sheathing. The third column of values in the tables is the percent reduction in the interaction equation value which is realized by using the current design procedure. It should be noted that this value was calculated for all top chord members in order to show a comparison value, although some of the chord members do not meet the specified requirements for the use of C_T.

The next column of values in the tables is that of the values for the "IEV from Analysis Including Sheathing" which considered the maximum stresses computed for each member including the effects of sheathing. In this case, the stresses determined including the sheathing were substituted into the same equation which was used in the without sheathing case. Additionally, this analysis

considered the actual effective length, l_e, or the length between points of zero moment. Therefore, the stresses effected the reduced values as well as using a more exact analysis than that used in the without sheathing case. The next column, then, is the percent reduction which is obtained when using this interaction equation value compared to the first value.

The last two columns of the tables represents the "Exact Maximum IEV" and its percent reduction from the value assuming no sheathing is present. The "Exact Maximum IEV" was calculated from the analysis which considered the effects of the sheathing. However, it is different from the values for "Analysis Including Sheathing" because it calculates the value for the interaction equation based on axial and flexural stresses which correspond to each other, or which occur at the same point in the wood. This is called the "Exact" value because it is computed to be the maximum after considering the stresses at eleven different locations along each top chord member. Once the stresses at these eleven points were identified, the interaction equation value at each location was calculated and the maximum value is what is shown in the table. Thus, the second to last column is the theoretical exact interaction equation value considering the effects of the sheathing, and the last column, therefore, is the percent reduction which could be factored in with the value neglecting sheathing without overstressing the wood.

All values shown are based on the same material properties except where a variance is shown. Therefore, all analyses were performed assuming the member modulus of elasticity, E, of 1,600,000 psi; extreme fiber stress in bending, F_b = 1400 psi; and F_c = 975 psi. These are values before conditions of use factors were applied. All conditions of use factors were considered to be 1.0 to simplify the calculations.

The tabular results of this analysis are shown in the Appendix in Tables A.1 through A.7. In addition to the results in tabular form, they are also presented in graphical form at the end of this chapter. These graphs compare the change in the interaction equation values, for the "IEV Including the use of C_T," the "IEV from Analysis Including Sheathing," and the "Exact Maximum IEV" from the analysis in which sheathing is ignored. For each truss one member was selected as being representative of the entire top chord and is used in the following graphs. The series of graphs presents the effects of each of the parameters studied. The term "sheathing effectiveness," which appears in each figure, refers to the percent reduction in the interaction equation values due to the inclusion of the sheathing in the analysis. The values on the vertical axis of the graph are the various interaction equation values divided by the base value (or the value for the case neglecting sheathing). A value of 1.00 represents a case where no reduction in the interaction equation value resulted from the indicated analysis.

Figure 3.18, below shows the effect of truss pitch on the sheathing effectiveness for member number 13 of truss type 6. This figure shows the typical results of this research. The dotted line, "Code Value"

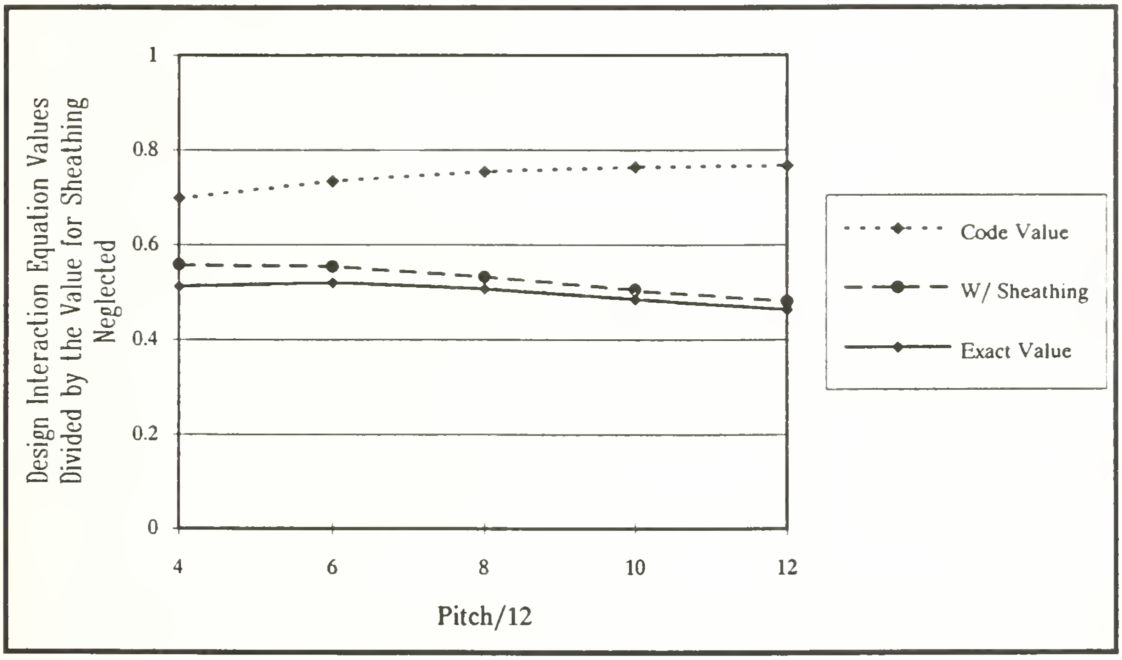


Fig. 3.18 EFFECT OF TRUSS PITCH ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 6, MEMBER 13)

represents the sheathing effectiveness allowed by the NDS provisions. As with almost all trusses and parameters, this value was considerably less than the other two sheathing effectiveness values with the solid line "Exact Value" representing the theoretical maximum value for the interaction equation for the given loading conditions. The spread of the "Code Value" line (which uses the term C_T) from

the other two lines indicates that the code does not do an adequate job in fully recognizing the sheathing which is actually present.

3.2.1 Effect of Truss Span on Sheathing Effectiveness for Interaction Equation Values

Typically, the effect of the sheathing was to decrease the value for the interaction equation value as the span increased (Figs.3.7 to 3.12). The lone exception to this case is Truss 1, which had higher values for the interaction equation at the longest span for both the "W/ Sheathing" and "Exact Value." This rare instance of the values increasing is attributed to two factors. Primarily, it is due to the fact that the compressive stresses in the member increased by a factor of four due to including sheathing in the analysis and the secondary factor is that, as there is only one top chord member and it was modeled as pinned at both ends, there was no reduction of the effective length to be included in the "W/ Sheathing" or "Exact Value" calculations.

As discussed above, the "W/ Sheathing" and "Exact Value" equations have taken into account the actual effective length, l_e, of the member. Therefore, it would be expected that the two middle chords of Truss 6, members 12 and 13, would be affected the most by the sheathing. This is evident in Fig. 3.12 which shows a sheathing effectiveness, for member 13, of 55 percent for the span/panel

ratio of 10. Similarly, from Table A.7 it can be seen that for member 12 the sheathing effectiveness is 58 percent. This is primarily due to the fact that these are members that have negative moment at each end and therefore have the greatest reduction in the l_e/d ratio due to the shorter span between zero moments.

It can also be seen from comparing Fig. 3.8 with Fig. 3.10 and Fig. 3.9 with Fig. 3.11 that the truss type is only a significant factor based on how it contributes to the span. Thus, although trusses 2 and 4 are different, the sheathing effectiveness of the two is very similar. Therefore, the only influence that truss type has on the values is that the larger spanning trusses have greater sheathing effectiveness and the trusses which have members with negative moments at each end also have greater sheathing effectiveness.

In general, it can be seen from Figs. 3.7 through 3.12 that increasing the span is a significant contributor to reducing the interaction equation values due to the effect of sheathing. It can also be seen that the equation in the code has made that correlation; however, it has not matched the magnitude of the gain which is actually realized.

3.2.2 Effect of Truss Pitch on Sheathing Effectiveness for Interaction Equation Values

Figures 3.13 through 3.18 indicate that the pitch of the truss does not have a great impact on the sheathing effectiveness. Typically, the values for the equations are slightly less for the higher pitch, mostly due to the increase in the length of the members. As the graphs are very nearly straight, there is not much gain due to added sheathing stiffness. However, from these figures it can be seen that there is significant room for improvement in the code equation. Figures 3.15 and 3.17 (Trusses 3 and 5) reflect very constant relationships between the three values plotted with the "Exact Value" being between 13 and 15 percent less than the "Code Value".

3.2.3 Effect of Chord Modulus of Elasticity on Sheathing Effectiveness for Interaction Equation Values

As with the truss pitch, Figs. 3.19 through 3.24 also show that variations in the modulus of elasticity of the chord members does not have a significant effect on the value of the interaction equation. The impact is very slight, however, it should be noted that stiffer members, with increased modulus of elasticity, will result in lower values for the sheathing effectiveness. This is as would be expected as the effect of the sheathing would contribute the same stiffness gain however its effect is less on a stiffer member.

Again, it can be seen that the "Code Value" lags considerably behind the theoretical maximum values and thus can be improved.

3.2.4 Effect of Sheathing Properties on Sheathing Effectiveness for Interaction Equation Values

The change in sheathing effectiveness due to the variation in sheathing properties was also very low. However, it should be noted that there were some differences in the changes with variations in the different properties.

The variation of the area of the sheathing (Figs. 3.25 to 3.30) showed almost no effect on truss 1 but showed a much greater change in truss 6. This is due to the fact that the longer spans develop larger strains and slips which are necessary to develop larger forces in the sheathing. Trusses 2, 3, 4, and 5 show effectiveness between those of truss 1 and truss 6.

The moment of inertia of the sheathing, however, shows almost no change in sheathing effectiveness due to a variation of the parameter (Figs. 3.31 to 3.36). Of the three sheathing variables, this is the least significant.

The last parameter of the sheathing, its modulus of elasticity, had a sheathing effectiveness somewhere between that of the sheathing area and the moment of inertia (Figs. 3.37 to 3.42). Effectiveness was smallest for truss 1 and was larger for the longer span trusses. This fact is mostly attributed to the fact that the stiffer sheathing (higher E) develops higher forces and moments for a

given strain, and the longer spans have larger differential displacements due to strains.

3.2.5 Effect of Spacing of Sheathing Connectors on Sheathing Effectiveness for Interaction Equation Values

Connector spacing had a large impact on the sheathing effectiveness Figs. 3.43 to 3.48). Closer spacing decreased the stresses in the wood members and therefore decreased the interaction equation values. This parameter is an important value to include since either a decrease in the connector spacing or an increase in connection stiffness will cause the layered member to respond more like a composite member. This effect will increase the stresses in the sheathing and the layer interface and cause the interaction equation values to decrease.

3.2.6 Effect of Truss Member Dimensions on Sheathing Effectiveness for Interaction Equation Values

Also as expected, the member dimensions had a significant impact on the sheathing effectiveness. The purpose of studying the effects of this parameter was to investigate whether or not an appreciable effectiveness would be felt by the larger members, not to show that the increased member dimensions would reduce the sheathing effectiveness.

Figures 3.49 though 3.54 clearly show that the effectiveness is reduced in the 2 x 6 and 2 x 8 members. However, there is still some effectiveness felt by the members, as much as 25 percent in a 2 x 6 and 18 percent in a 2 x 8 (values for truss 6). Therefore, the code provision, which limits the buckling stiffness factor to only 2 x 4 members, neglects a significant amount of sheathing effectiveness.

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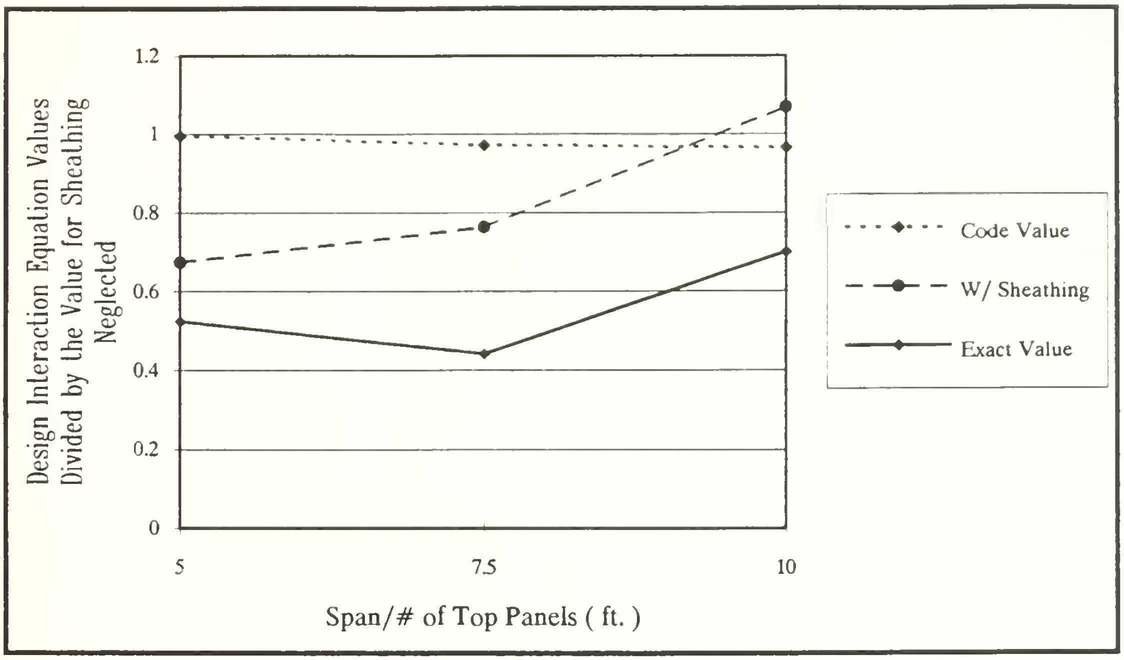


Fig. 3.7 EFFECT OF TRUSS SPAN ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 1, MEMBER 3)

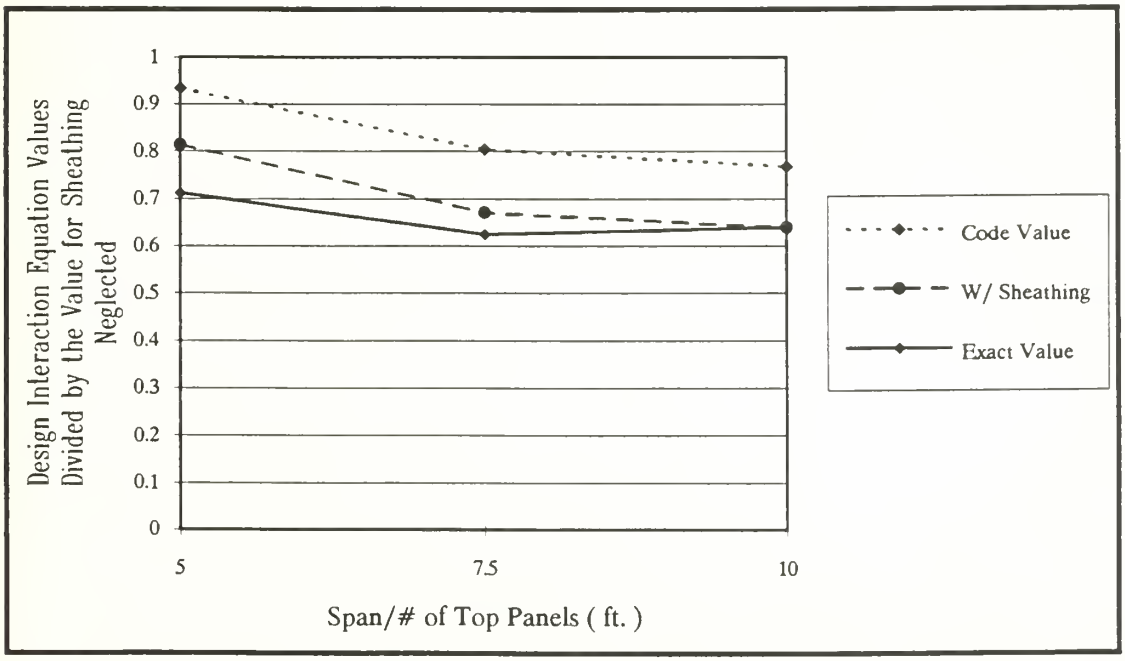


Fig. 3.8 EFFECT OF TRUSS SPAN ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 2, MEMBER 6)

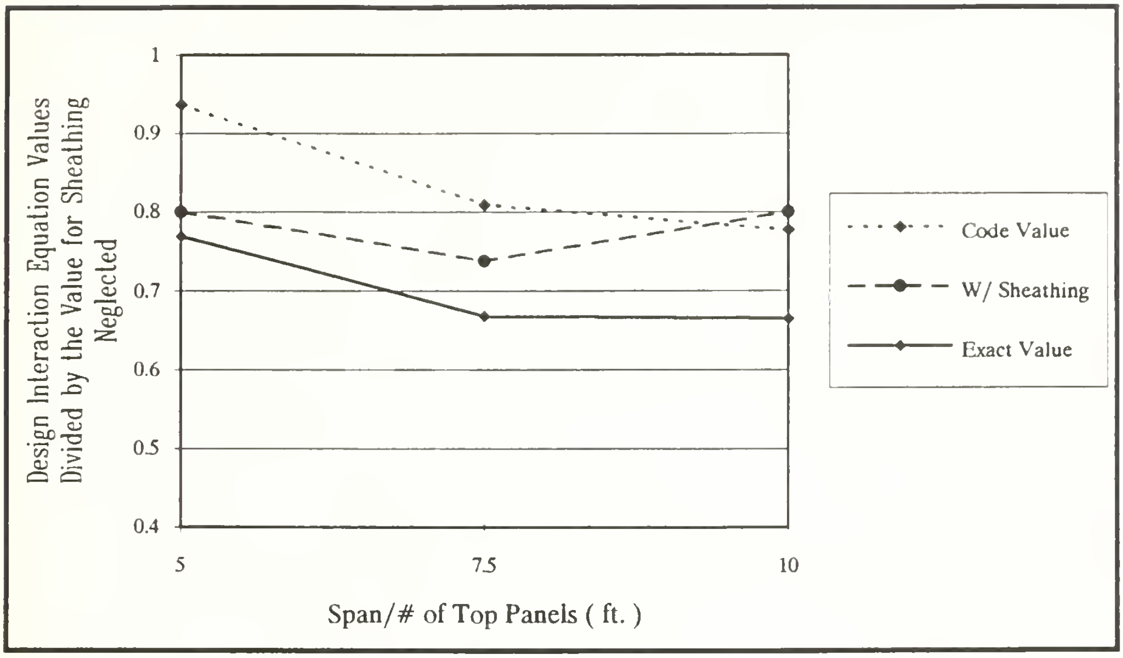


Fig. 3.9 EFFECT OF TRUSS SPAN ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 3, MEMBER 11)

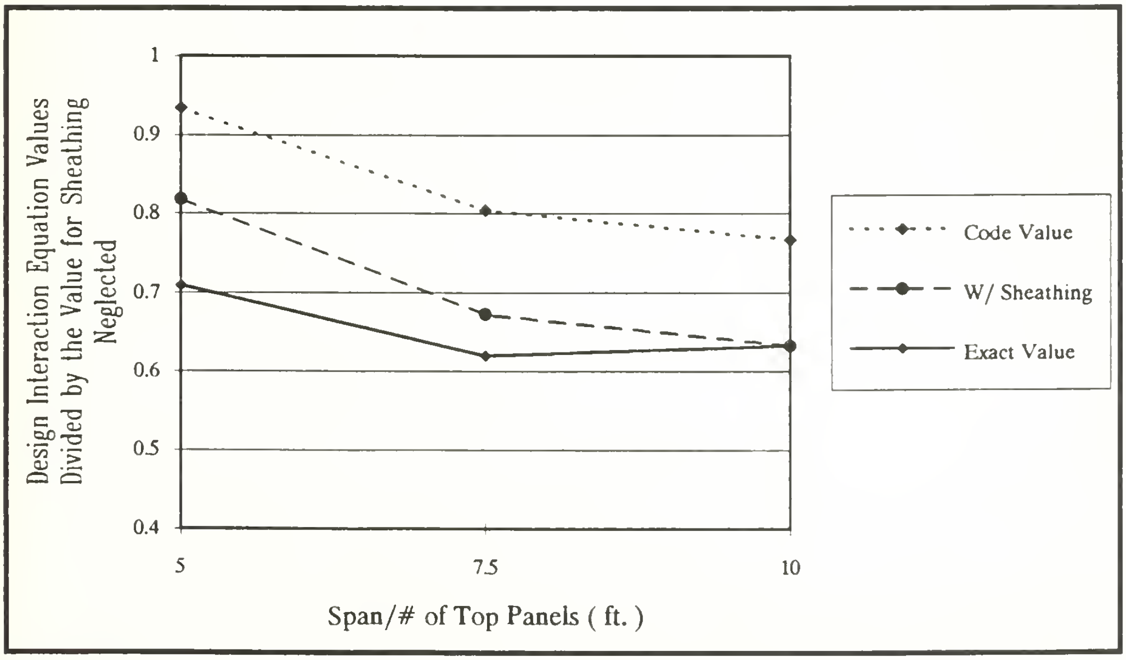


Fig. 3.10 EFFECT OF TRUSS SPAN ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 4, MEMBER 5)

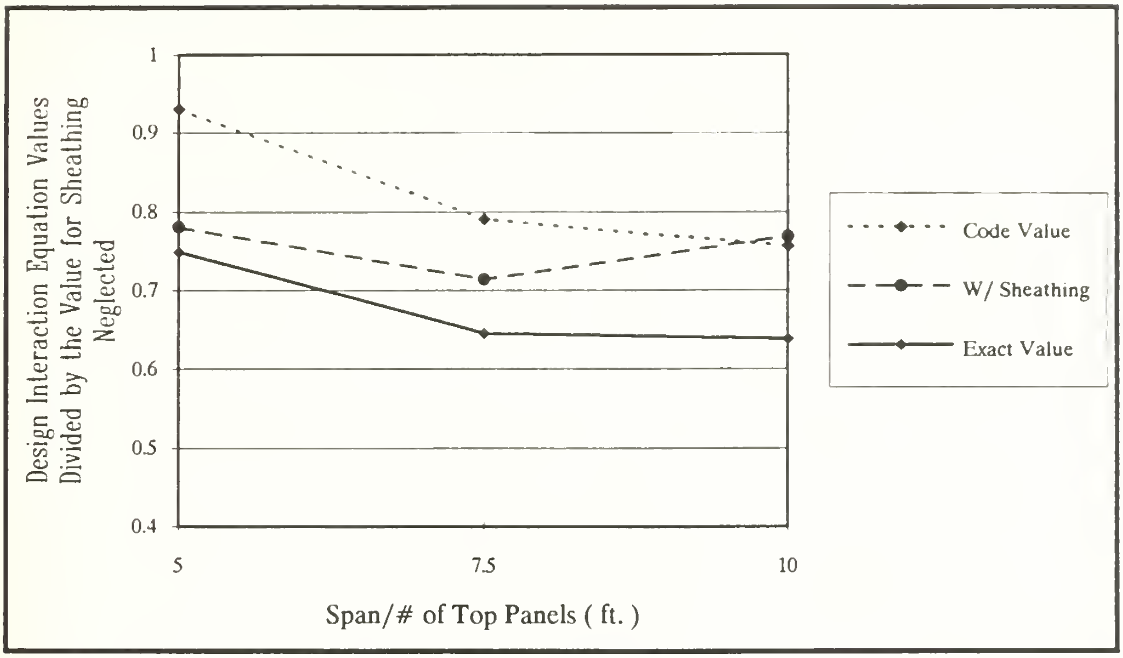


Fig. 3.11 EFFECT OF TRUSS SPAN ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 5, MEMBER 10)

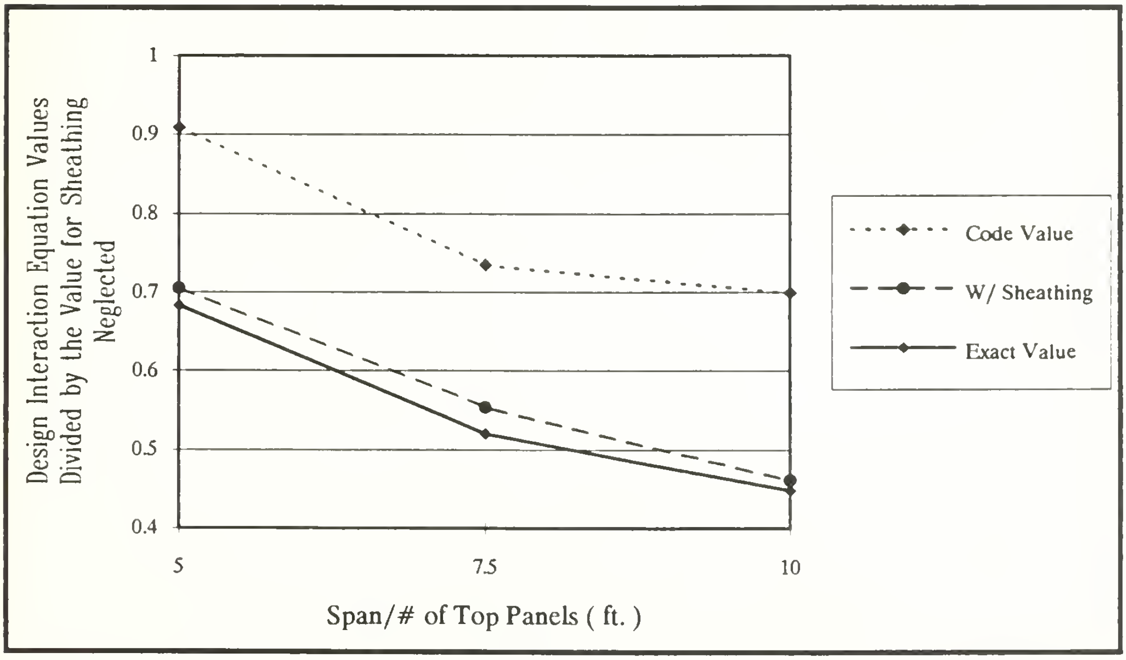


Fig. 3.12 EFFECT OF TRUSS SPAN ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 6, MEMBER 13)

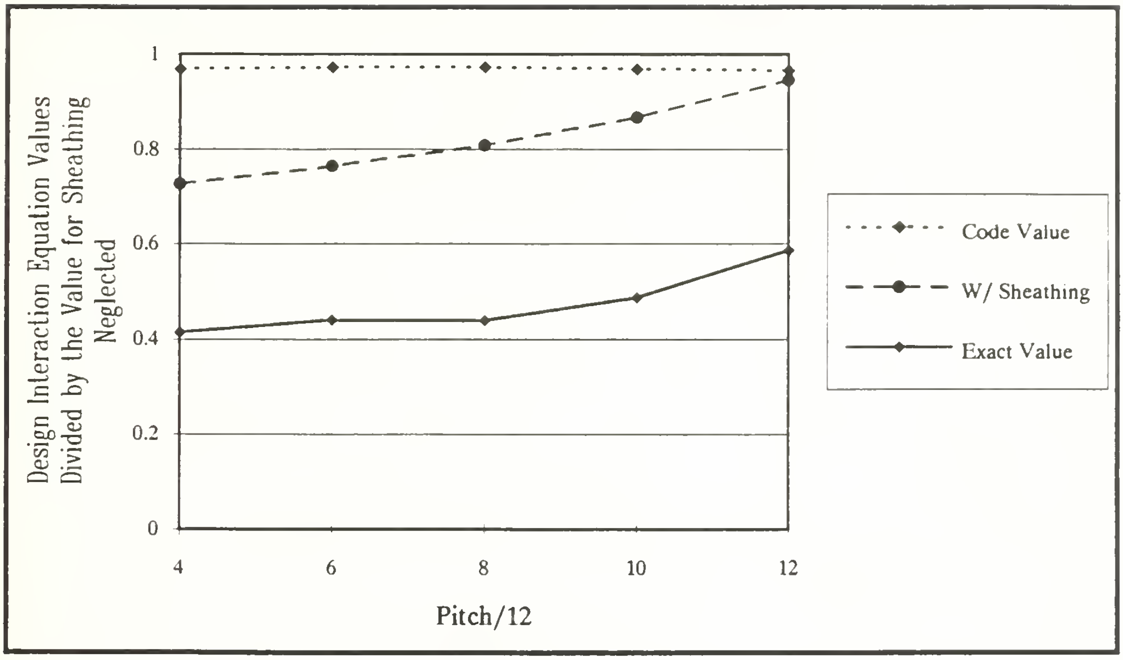


Fig. 3.13 EFFECT OF TRUSS PITCH ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 1, MEMBER 3)

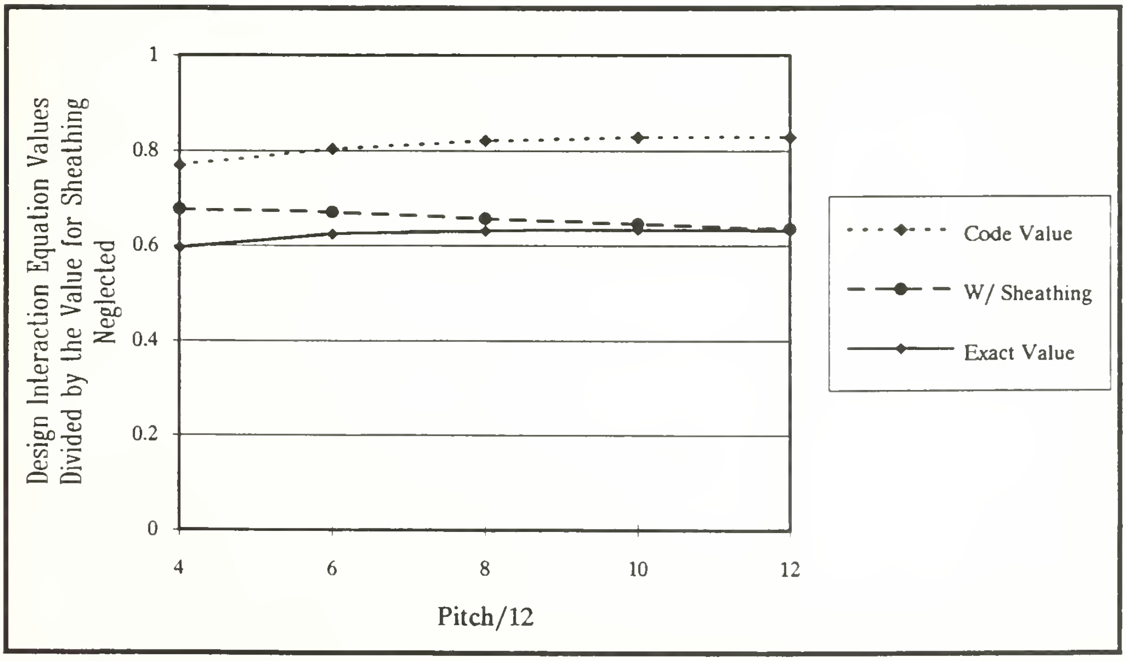


Fig. 3.14 EFFECT OF TRUSS PITCH ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 2, MEMBER 6)

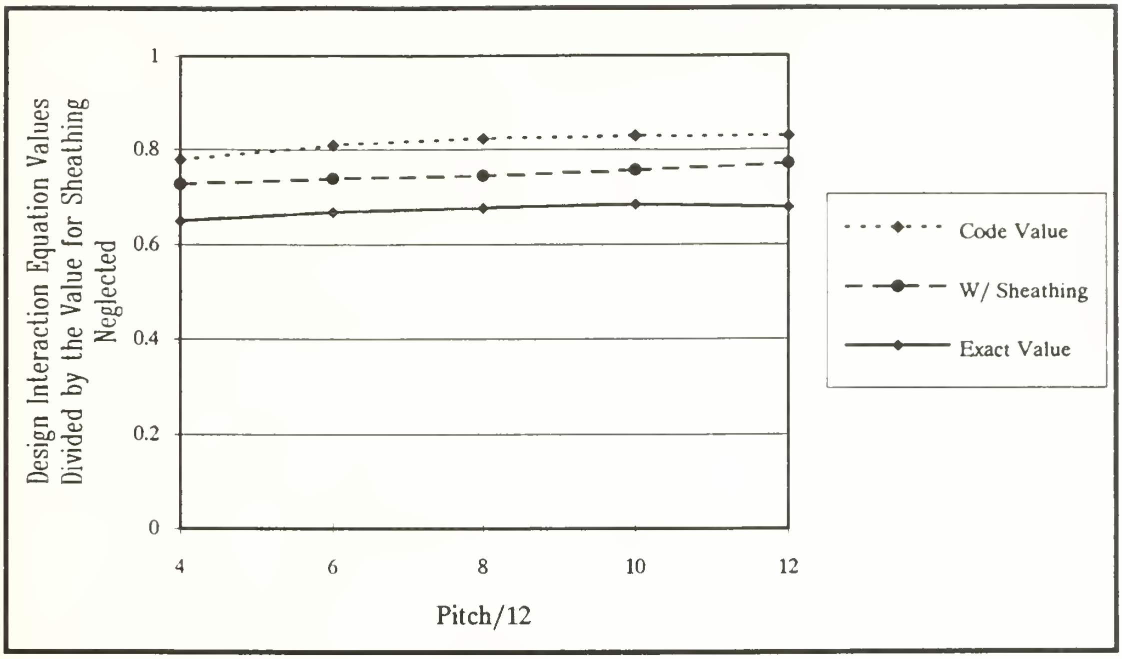


Fig. 3.15 EFFECT OF TRUSS PITCH ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 3, MEMBER 11)

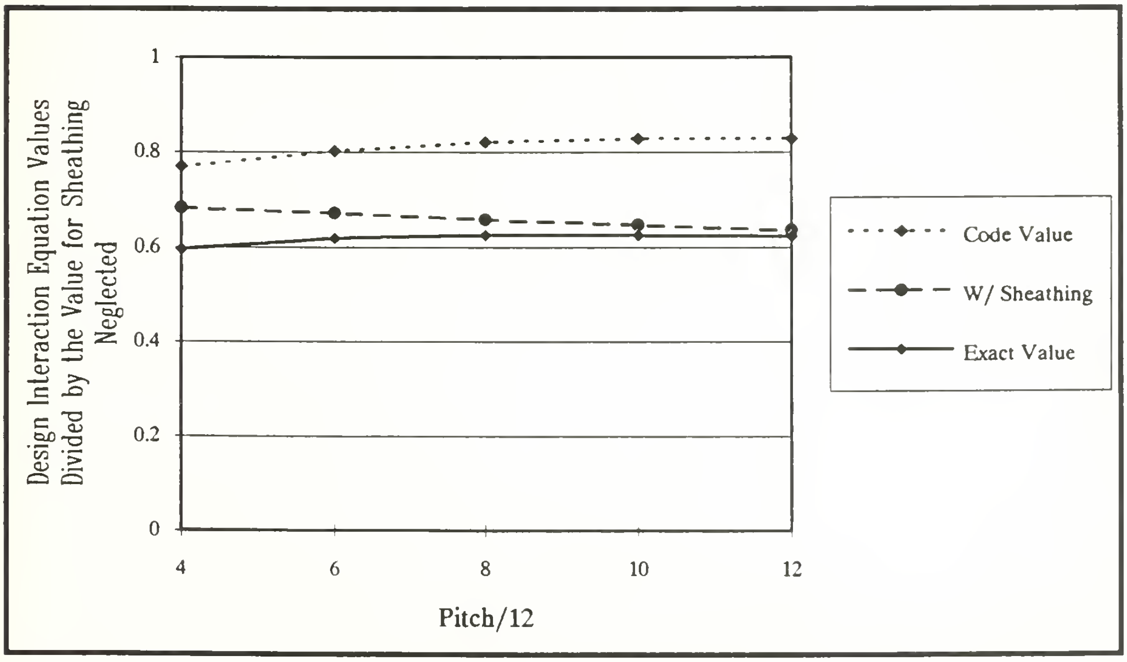


Fig. 3.16 EFFECT OF TRUSS PITCH ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 4, MEMBER 5)

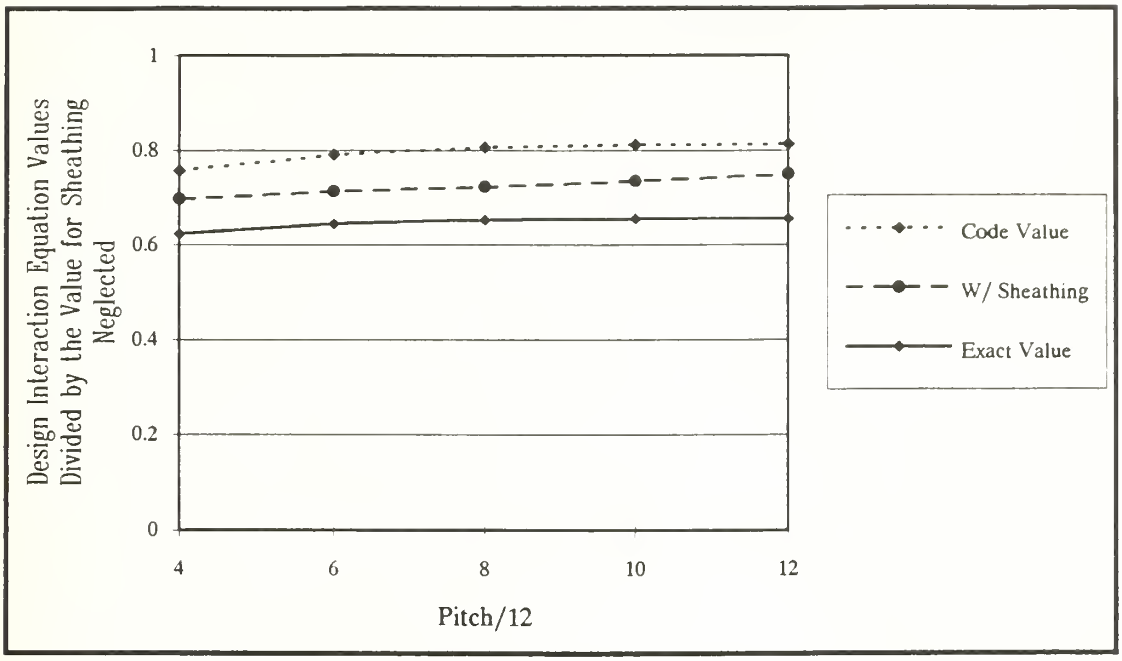


Fig. 3.17 EFFECT OF TRUSS PITCH ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 5, MEMBER 10)

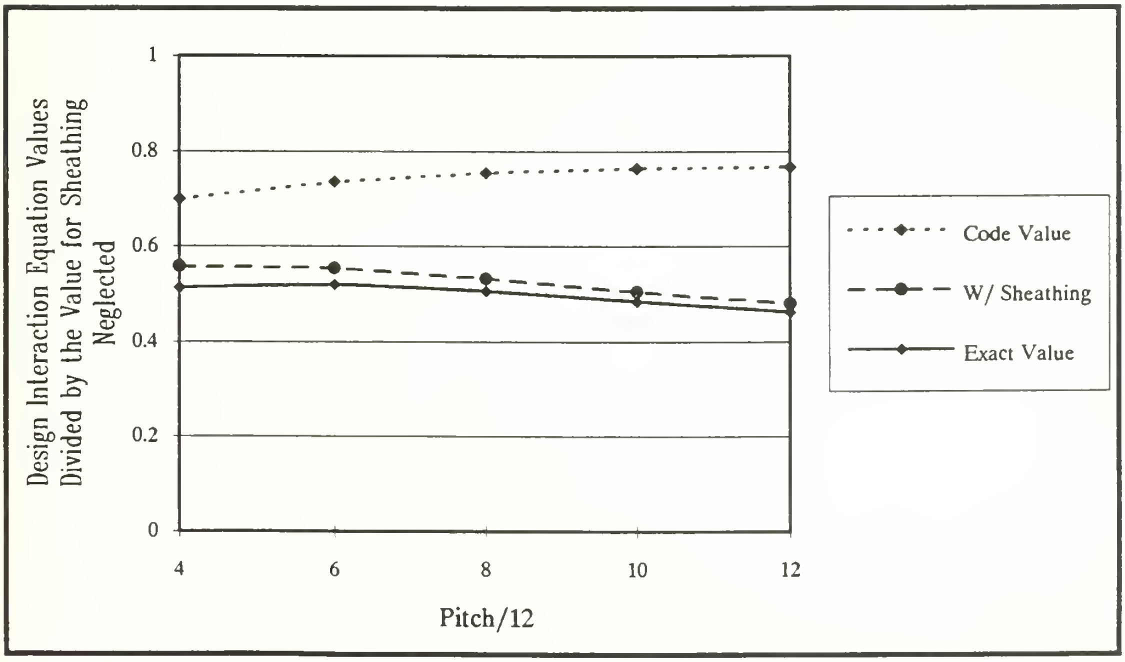


Fig. 3.18 EFFECT OF TRUSS PITCH ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 6, MEMBER 13)

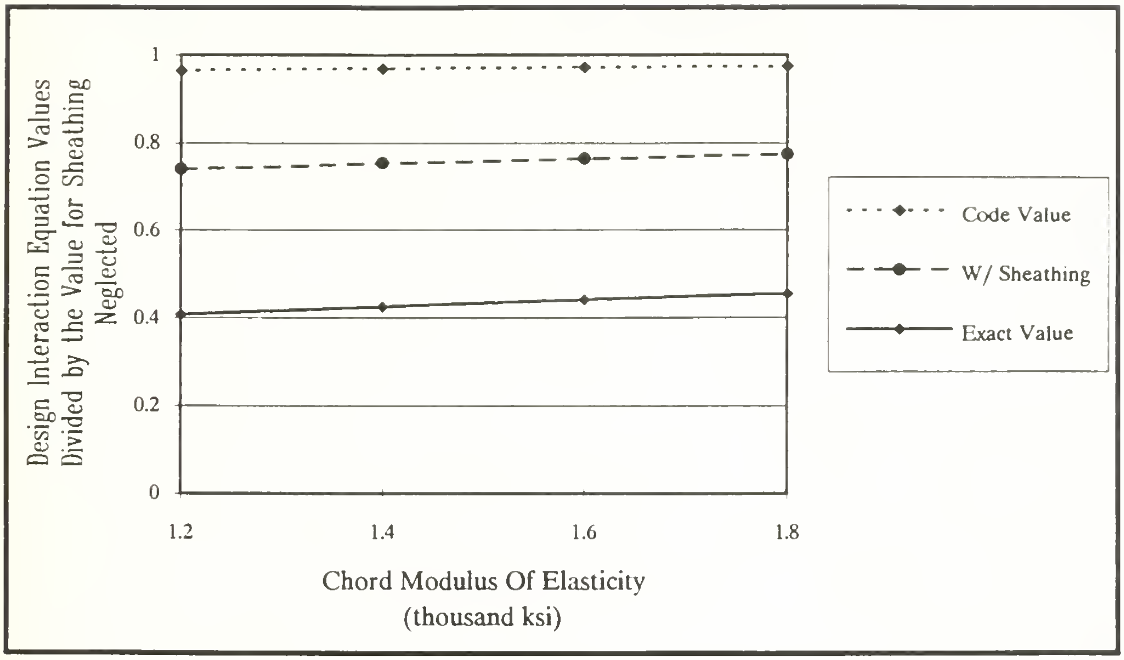


Fig. 3.19 EFFECT OF CHORD MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 1, MEMBER 3)

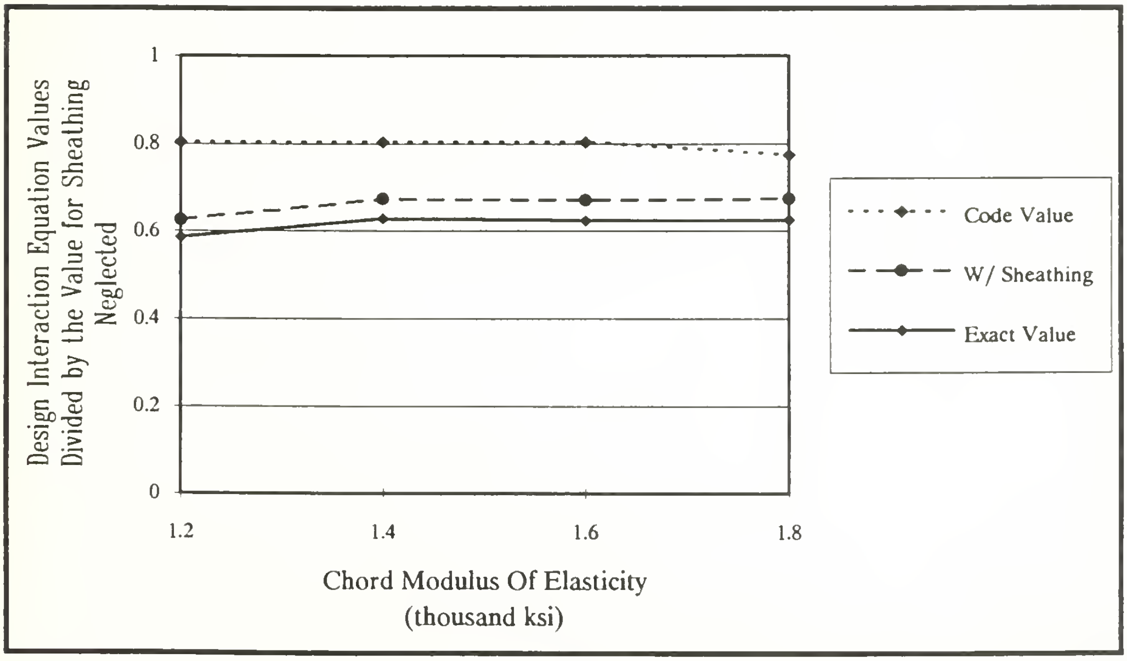


Fig. 3.20 EFFECT OF CHORD MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 2, MEMBER 6)

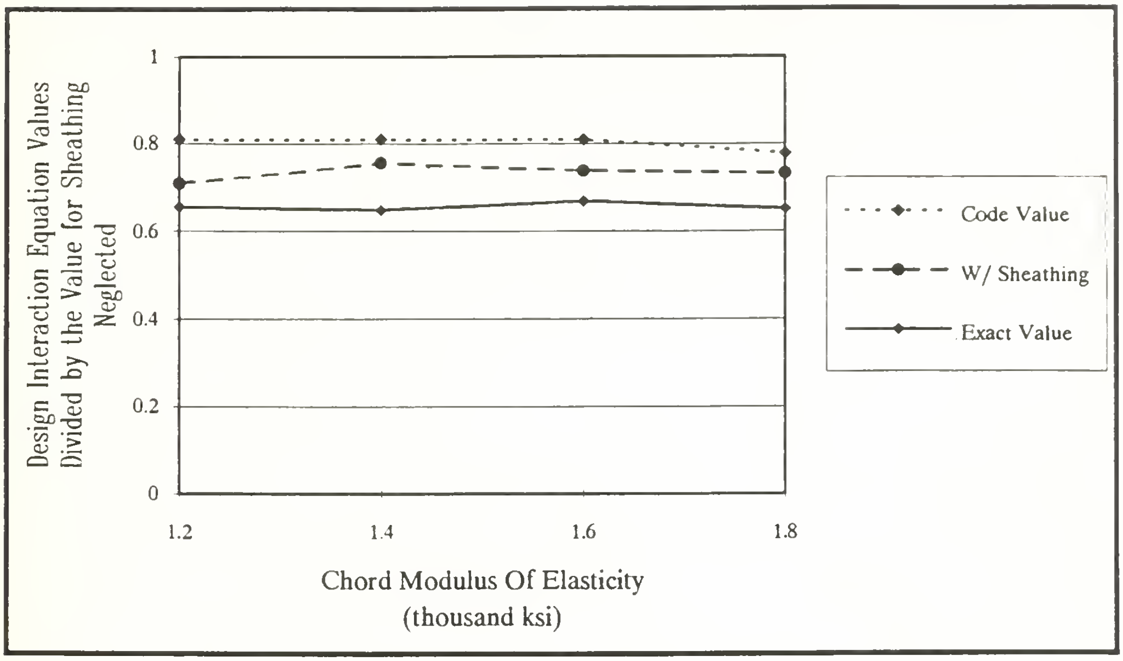


Fig. 3.21 EFFECT OF CHORD MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 3, MEMBER 11)

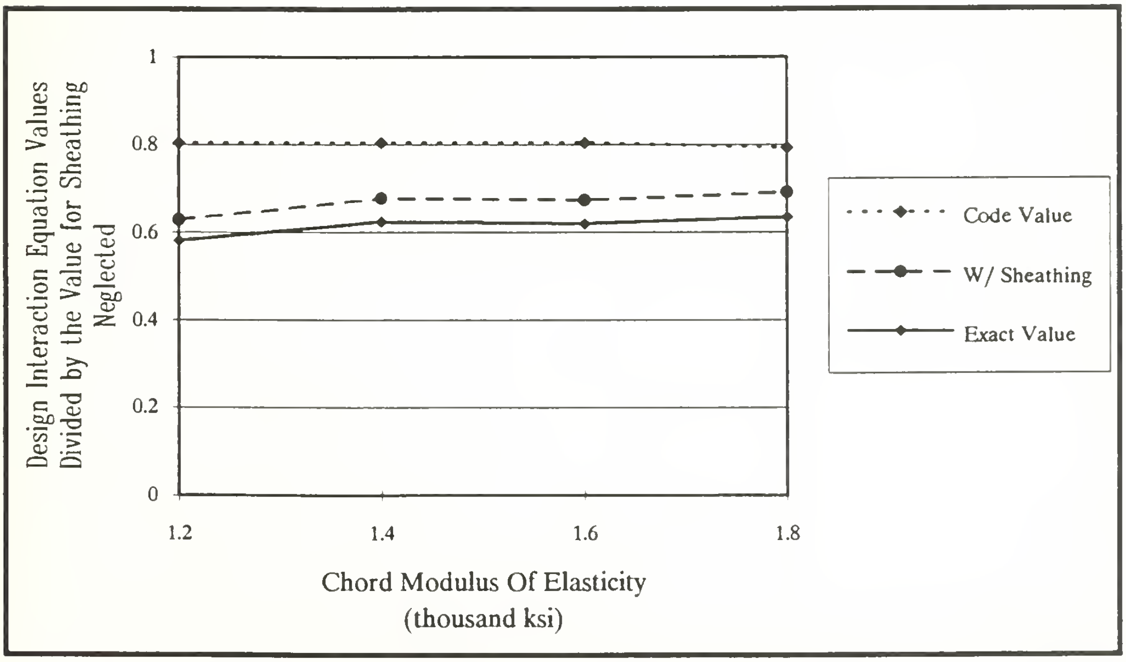


Fig. 3.22 EFFECT OF CHORD MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 4, MEMBER 5)

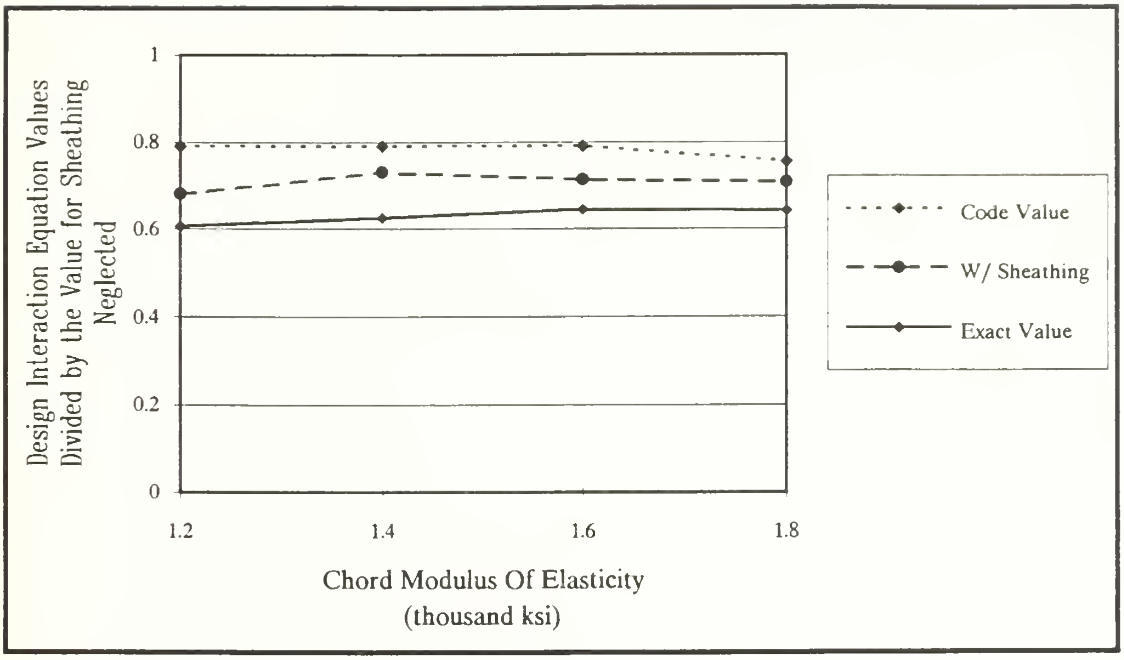


Fig. 3.23 EFFECT OF CHORD MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 5, MEMBER 10)

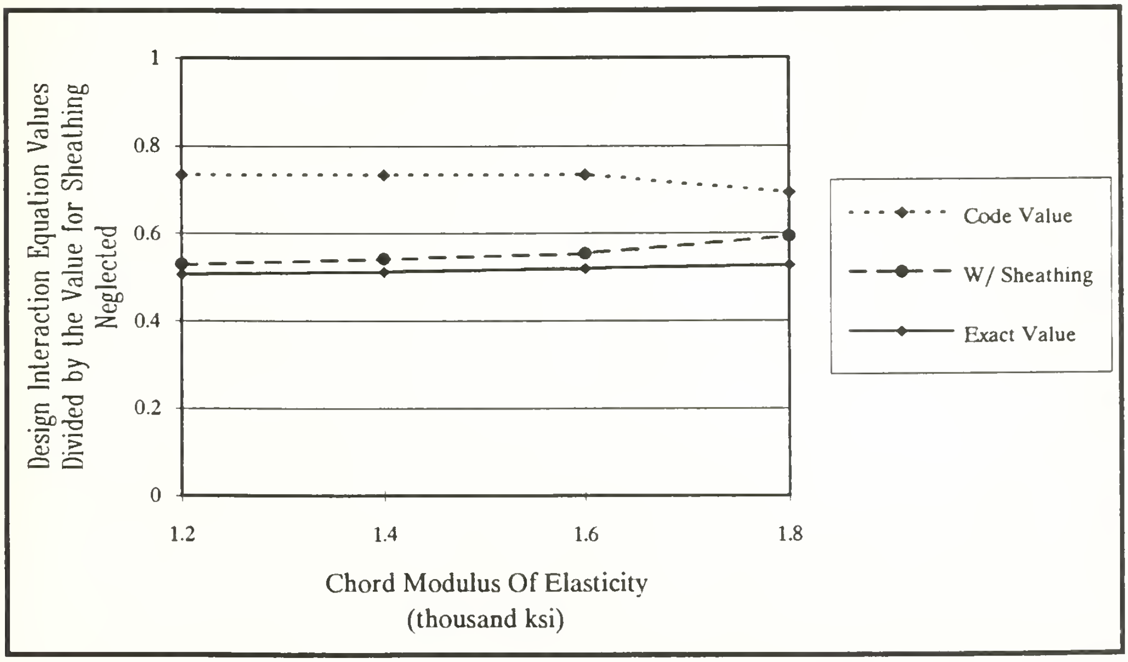


Fig. 3.24 EFFECT OF CHORD MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 6, MEMBER 13)

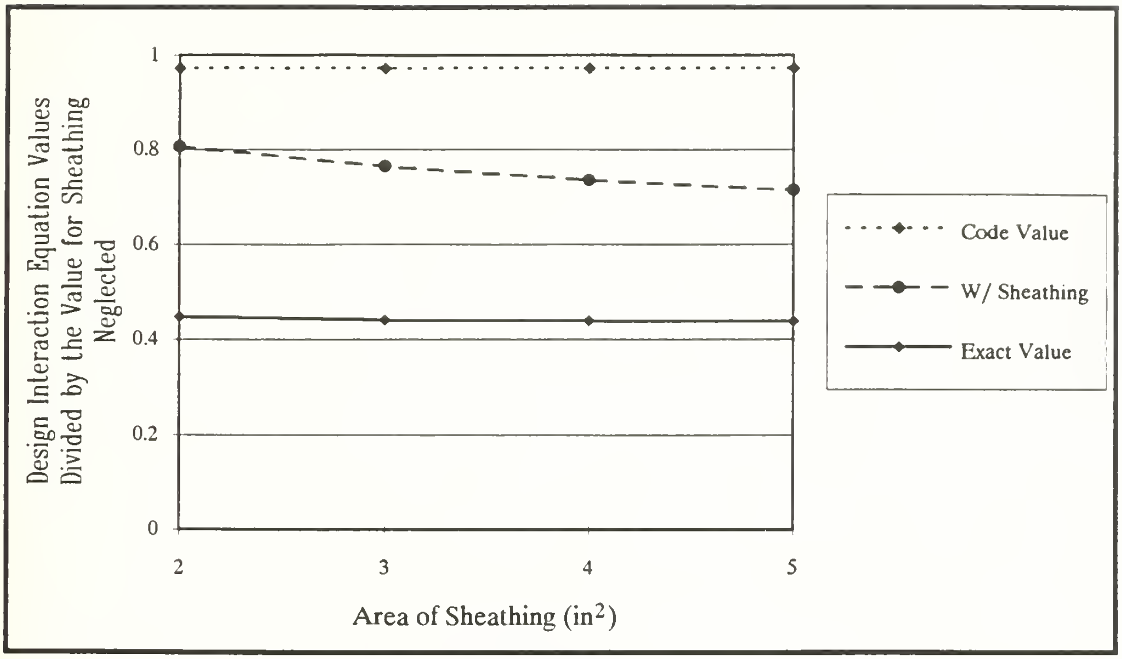


Fig. 3.25 EFFECT OF TRUSS SHEATHING AREA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 1, MEMBER 3)

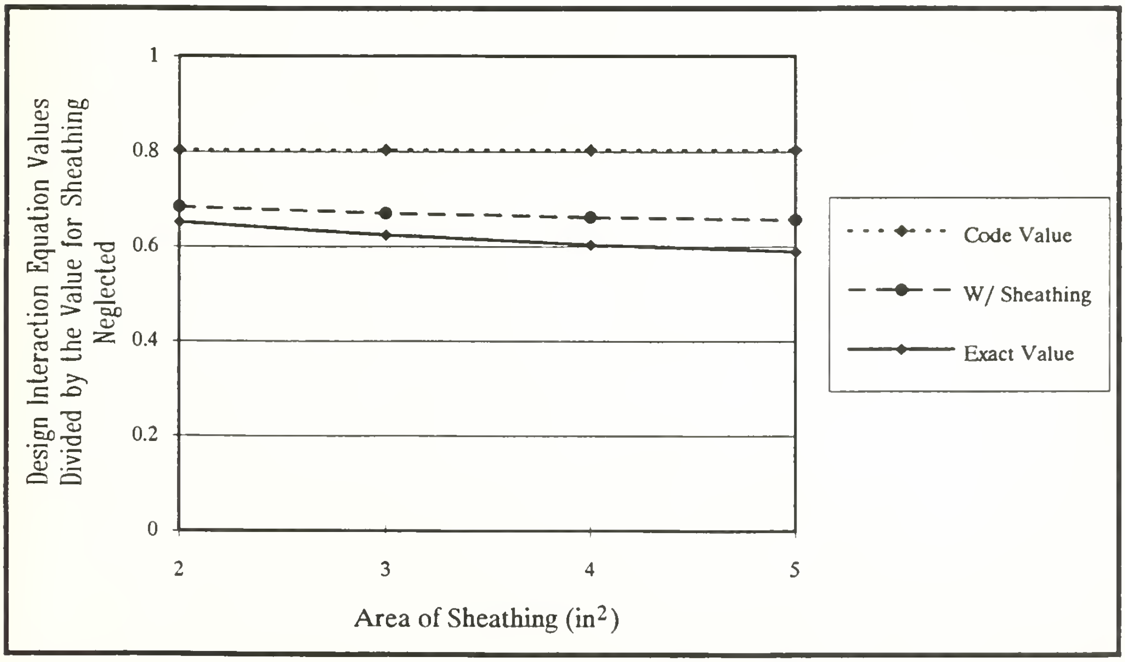


Fig. 3.26 EFFECT OF TRUSS SHEATHING AREA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 2, MEMBER 6)

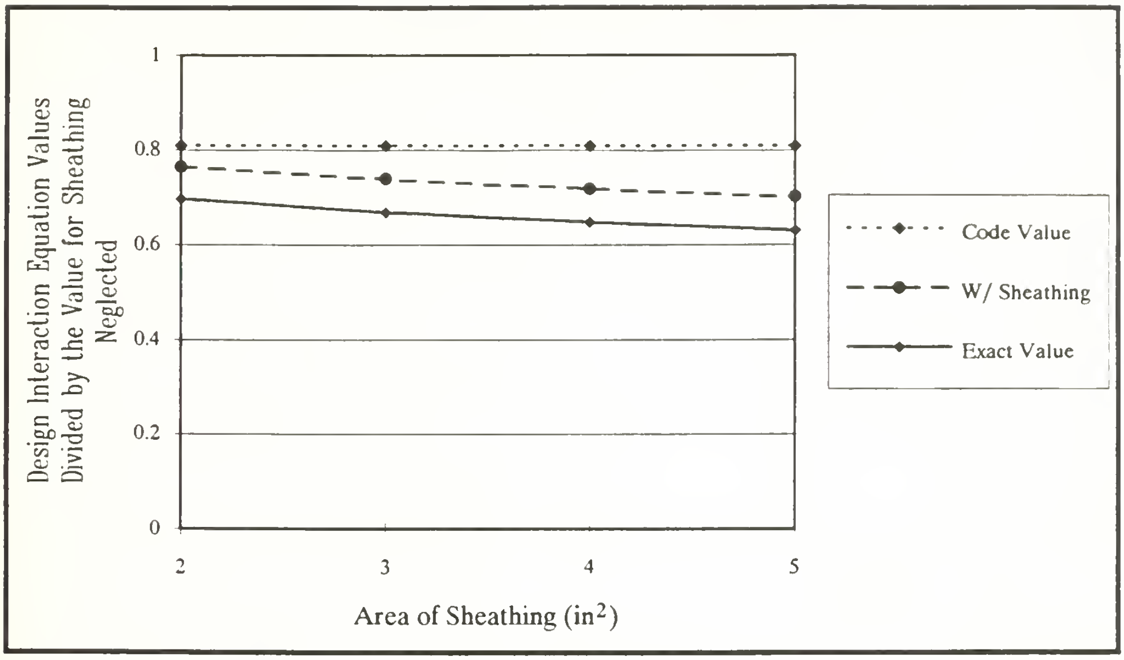


Fig. 3.27 EFFECT OF TRUSS SHEATHING AREA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 3, MEMBER 11)

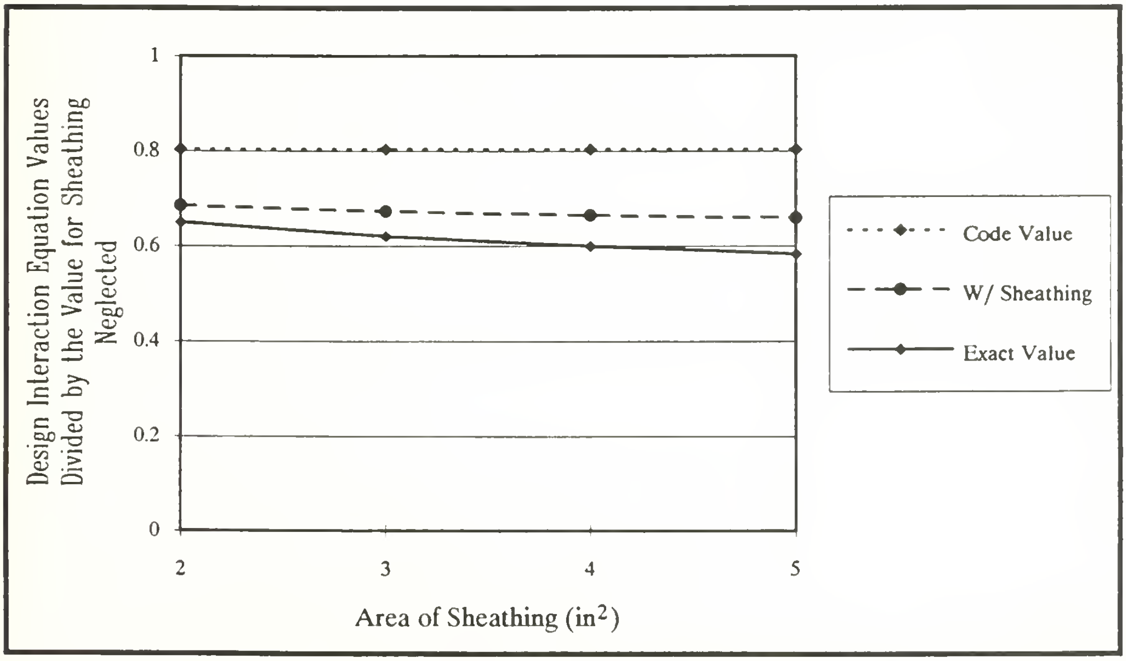


Fig. 3.28 EFFECT OF TRUSS SHEATHING AREA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 4, MEMBER 5)

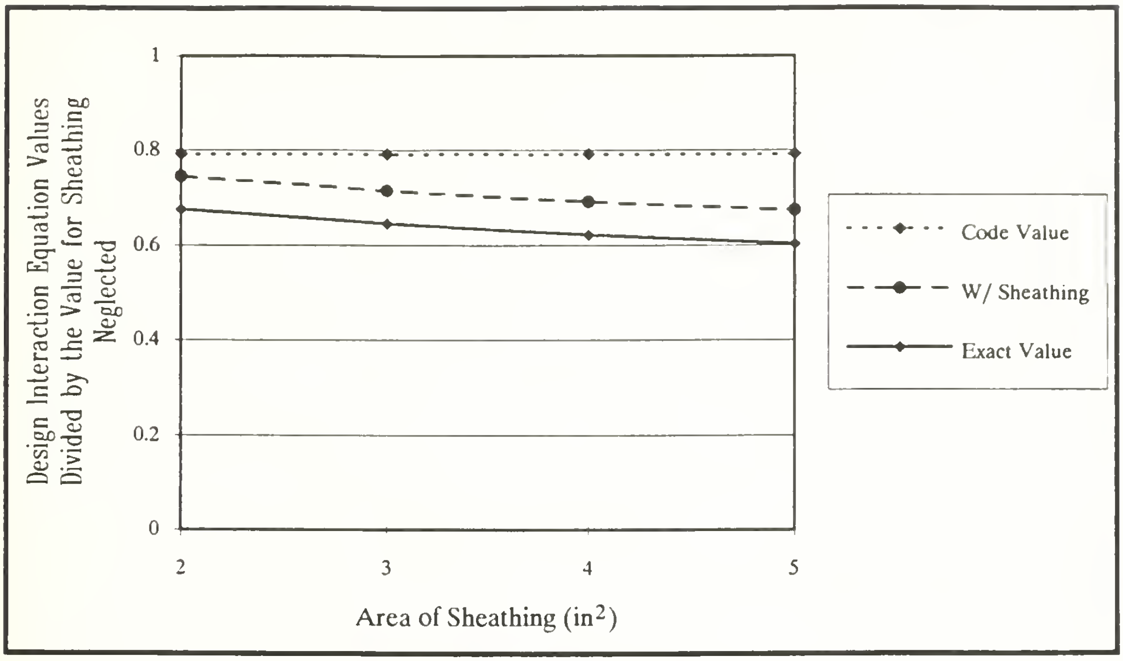


Fig. 3.29 EFFECT OF TRUSS SHEATHING AREA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 5, MEMBER 10)

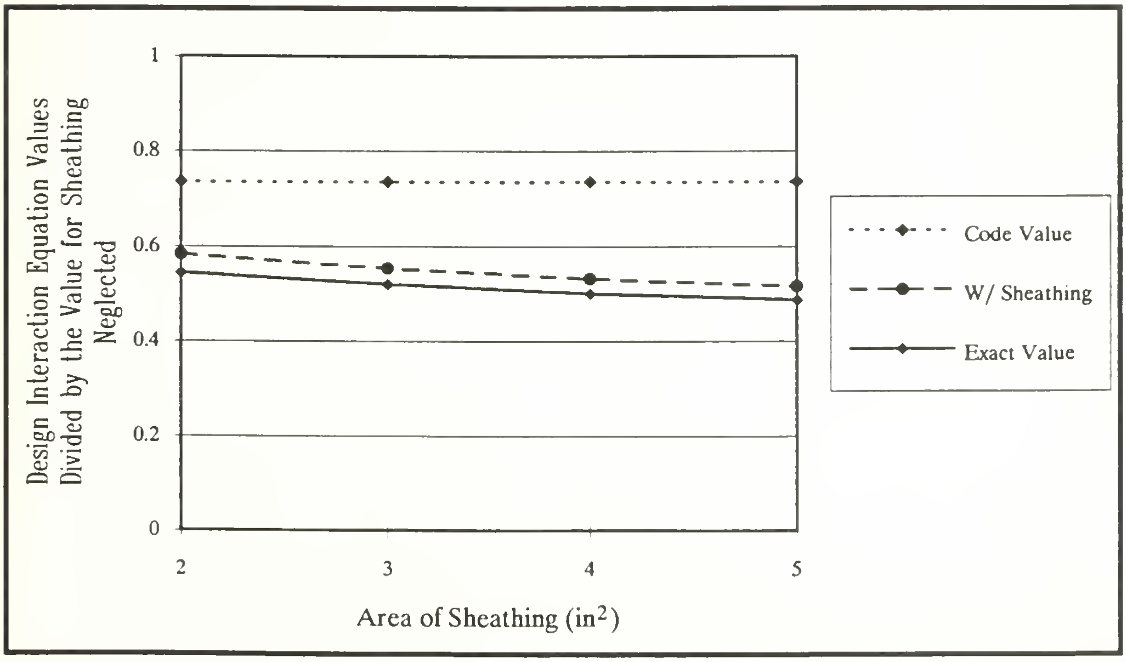


Fig. 3.30 EFFECT OF TRUSS SHEATHING AREA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 6, MEMBER 13)

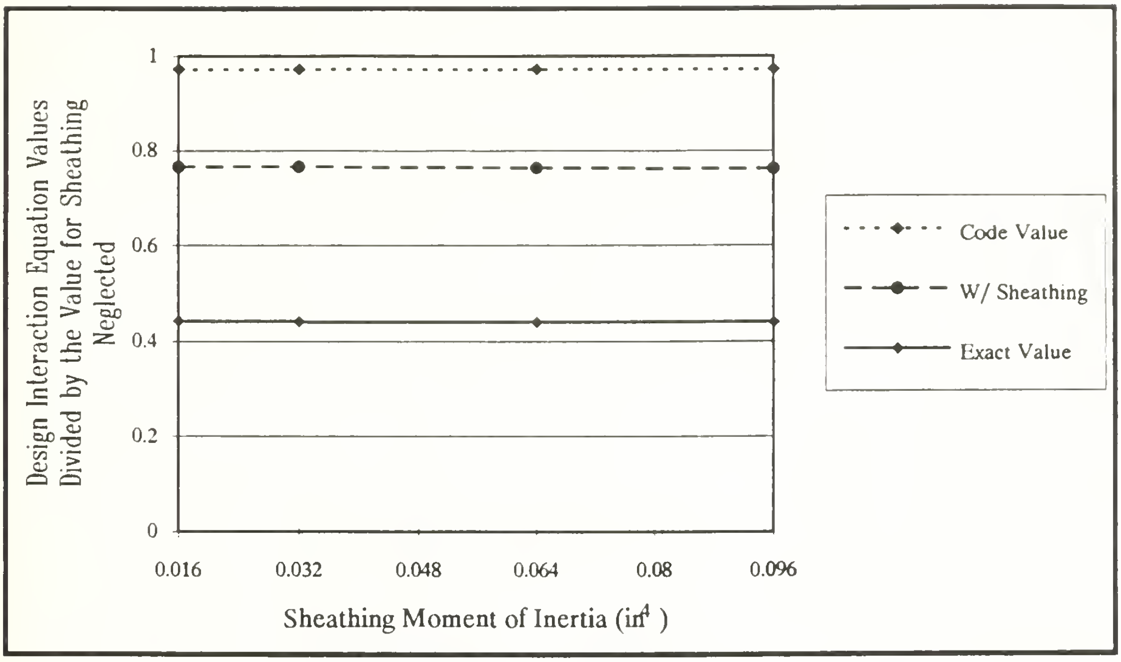


Fig. 3.31 EFFECT OF TRUSS SHEATHING MOMENT OF INERTIA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 1, MEMBER 3)

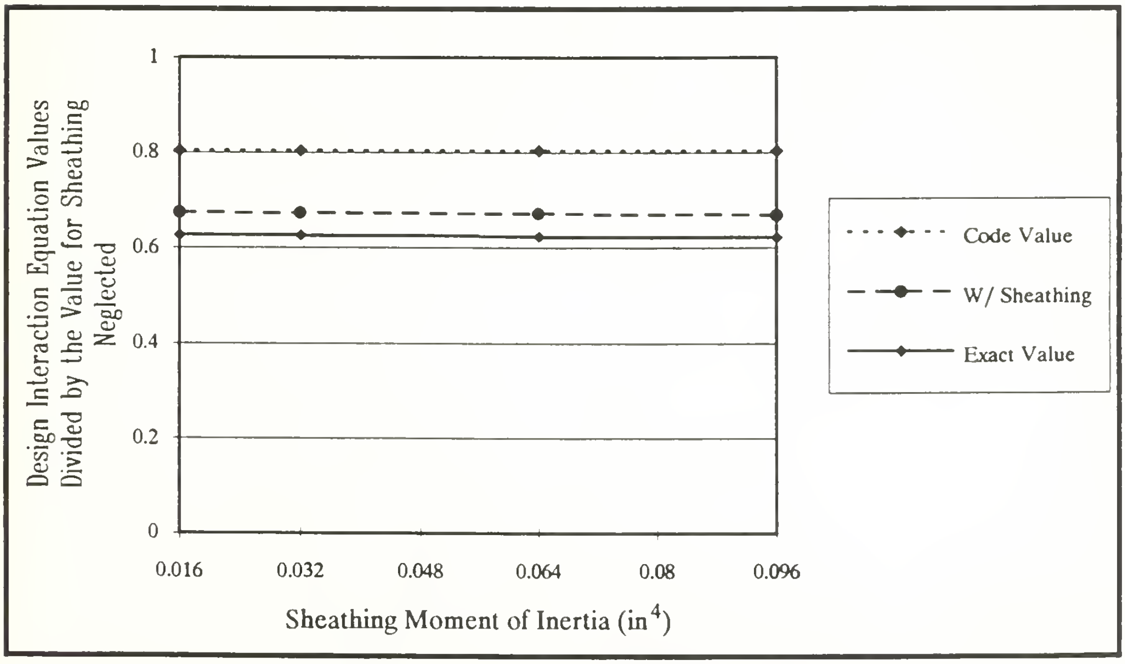


Fig. 3.32 EFFECT OF TRUSS SHEATHING MOMENT OF INERTIA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 2, MEMBER 6)

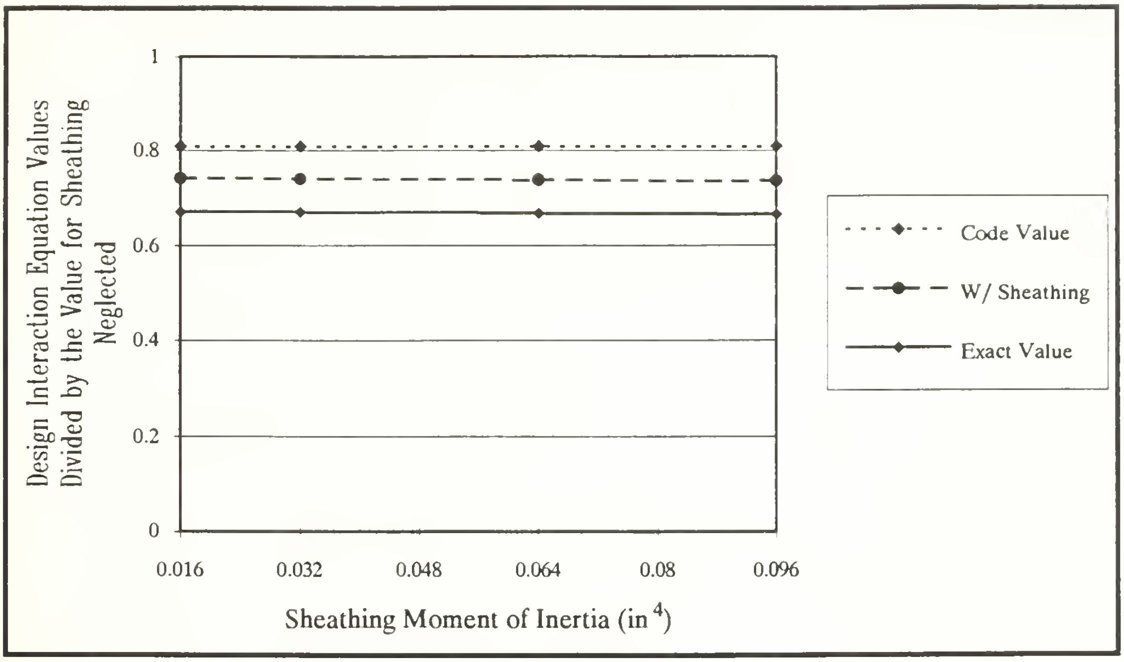


Fig. 3.33 EFFECT OF TRUSS SHEATHING MOMENT OF INERTIA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 3, MEMBER 11)

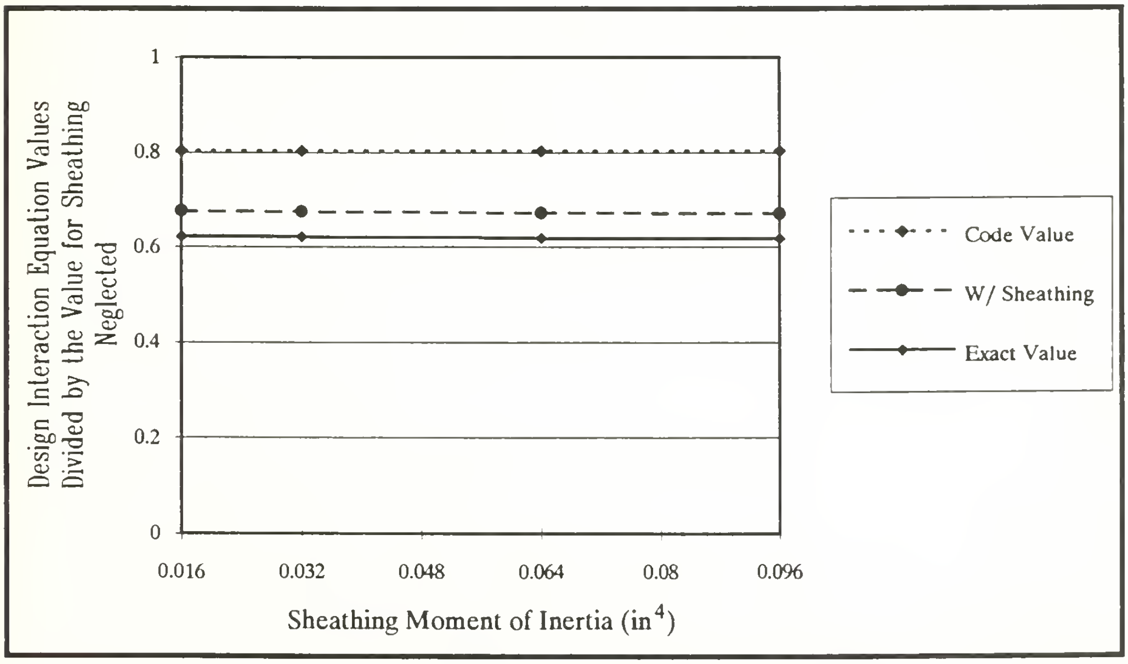


Fig. 3.34 EFFECT OF TRUSS SHEATHING MOMENT OF INERTIA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 4, MEMBER 5)

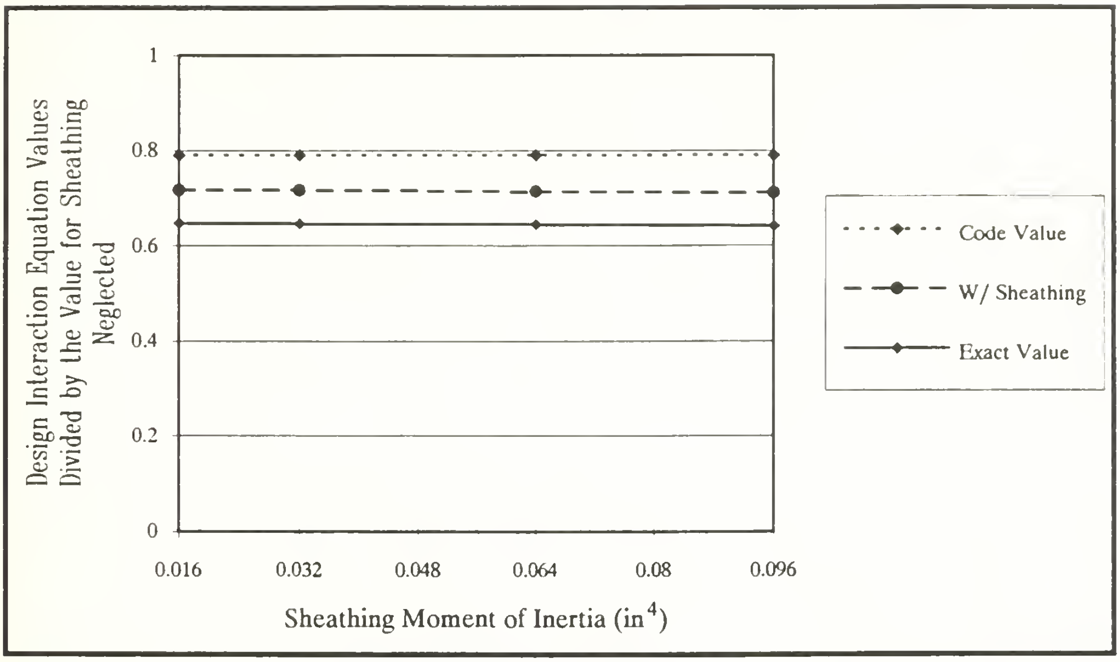


Fig. 3.35 EFFECT OF TRUSS SHEATHING MOMENT OF INERTIA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 5, MEMBER 10)

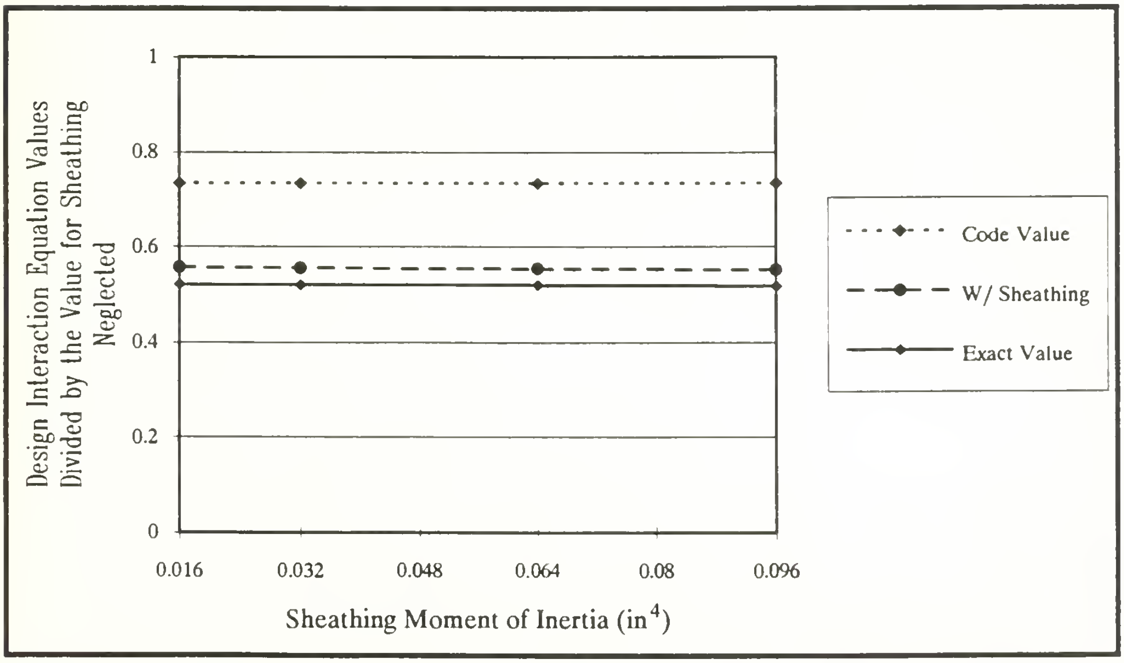


Fig. 3.36 EFFECT OF TRUSS SHEATHING MOMENT OF INERTIA ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 6, MEMBER 13)

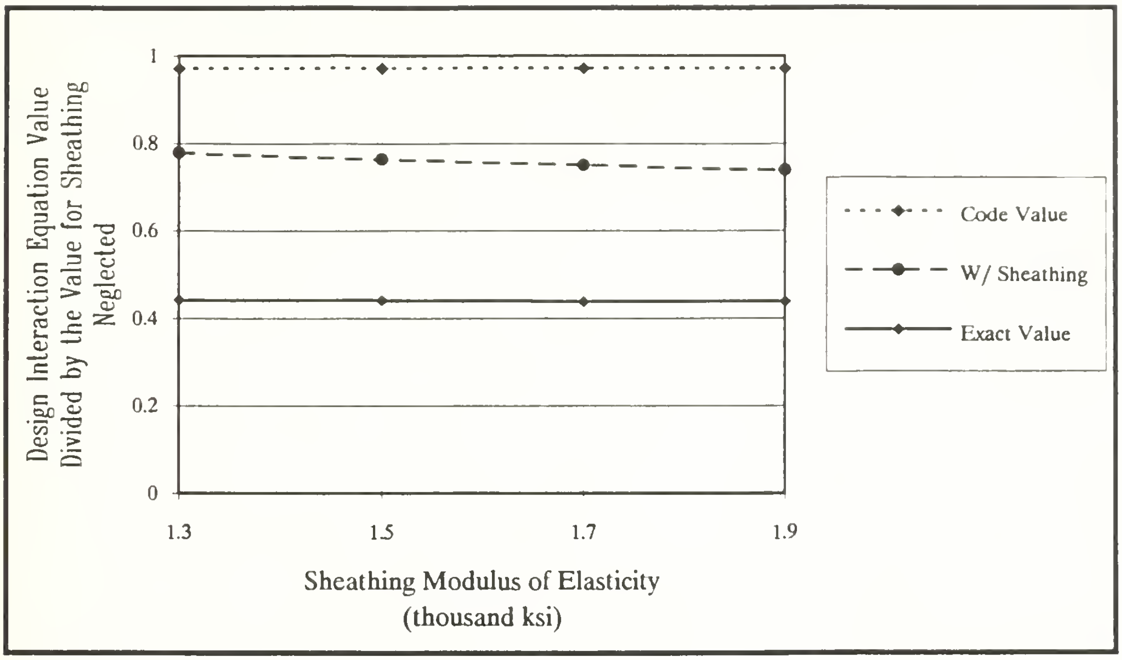


Fig. 3.37 EFFECT OF TRUSS SHEATHING MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 1, MEMBER 3)

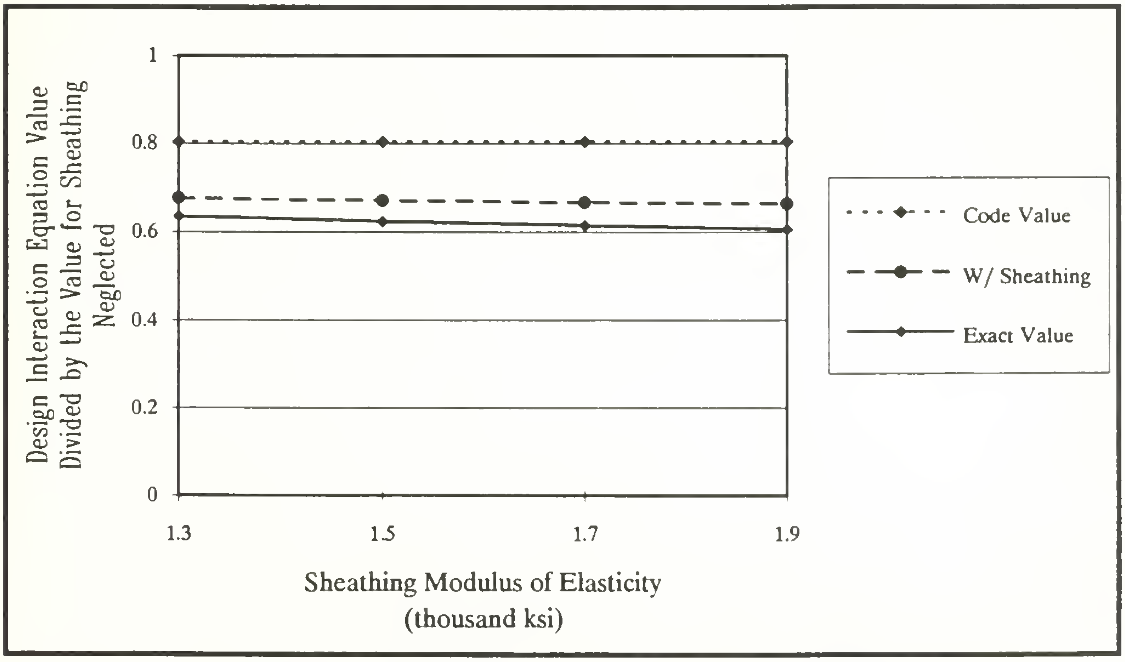


Fig. 3.38 EFFECT OF TRUSS SHEATHING MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 2, MEMBER 6)

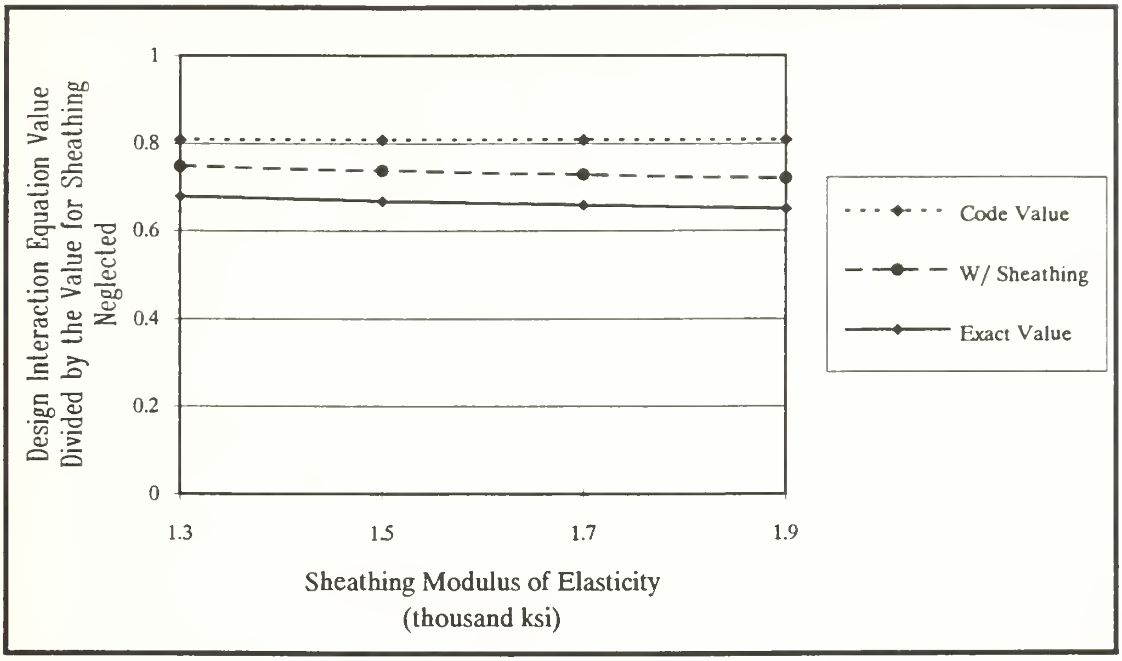


Fig. 3.39 EFFECT OF TRUSS SHEATHING MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 3, MEMBER 11)

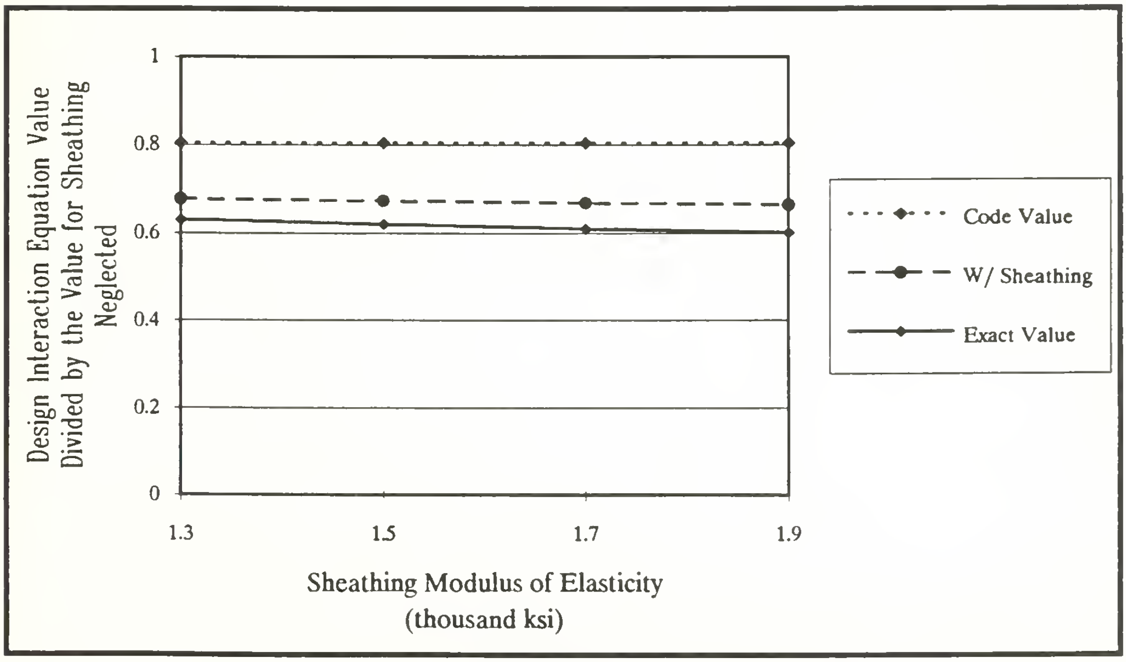


Fig. 3.40 EFFECT OF TRUSS SHEATHING MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 4, MEMBER 5)

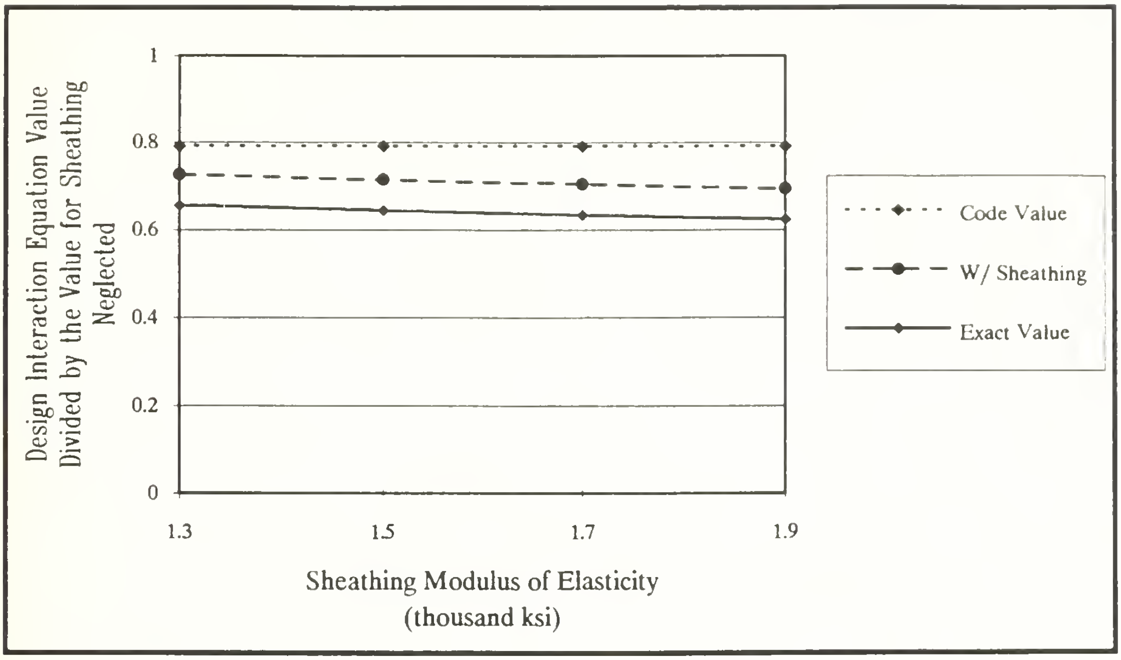


Fig. 3.41 EFFECT OF TRUSS SHEATHING MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 5, MEMBER 10)

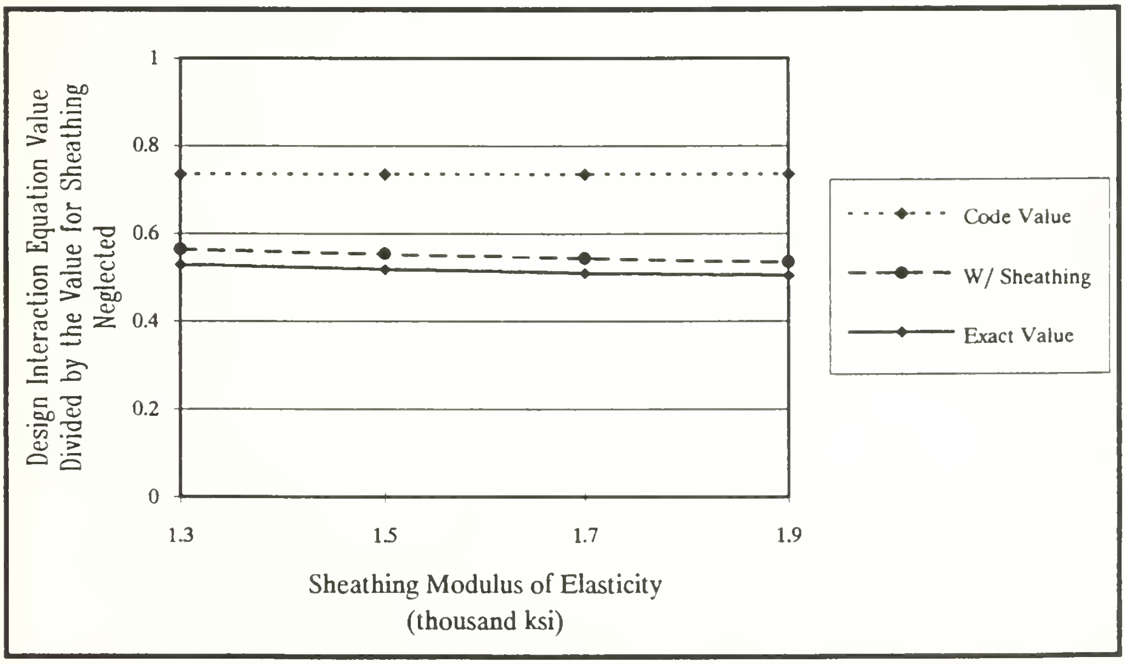


Fig. 3.42 EFFECT OF TRUSS SHEATHING MODULUS OF ELASTICITY ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 6, MEMBER 13

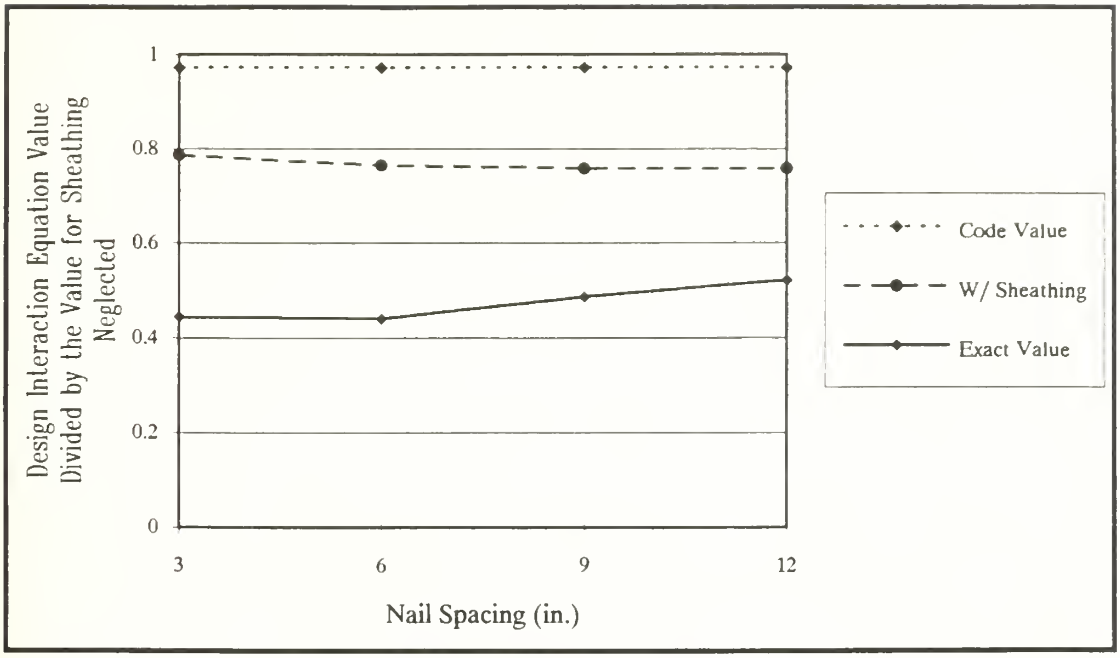


Fig. 3.43 EFFECT OF SPACING OF SHEATHING CONNECTORS ON THE SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 1, MEMBER 3)

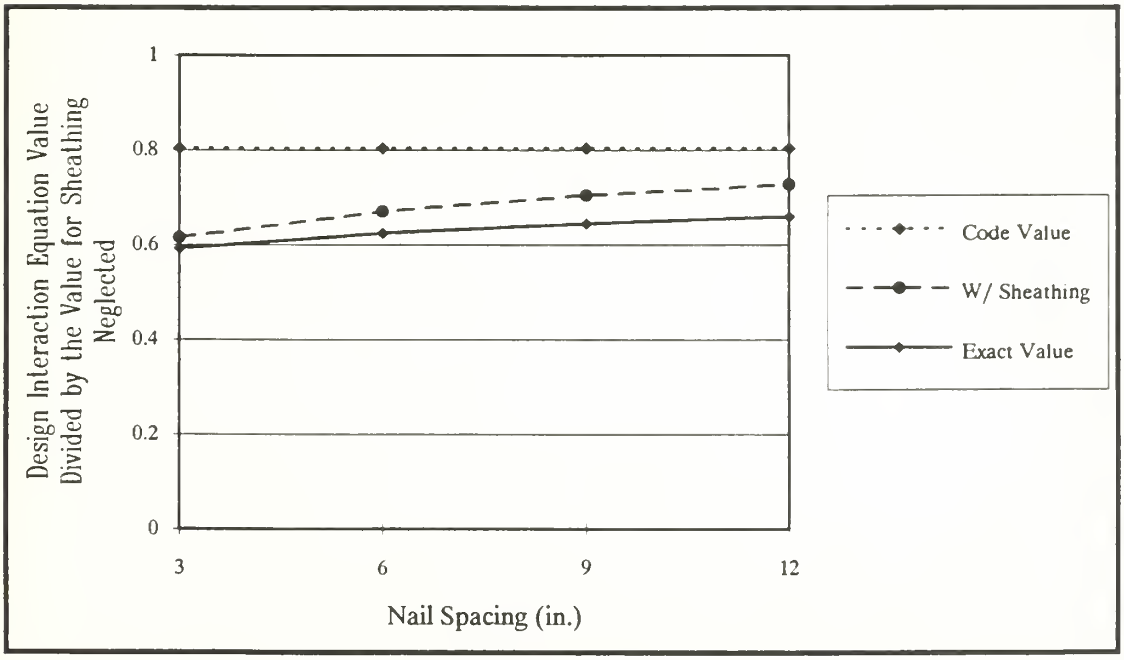


Fig. 3.44 EFFECT OF SPACING OF SHEATHING CONNECTORS ON THE SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 2, MEMBER 6)

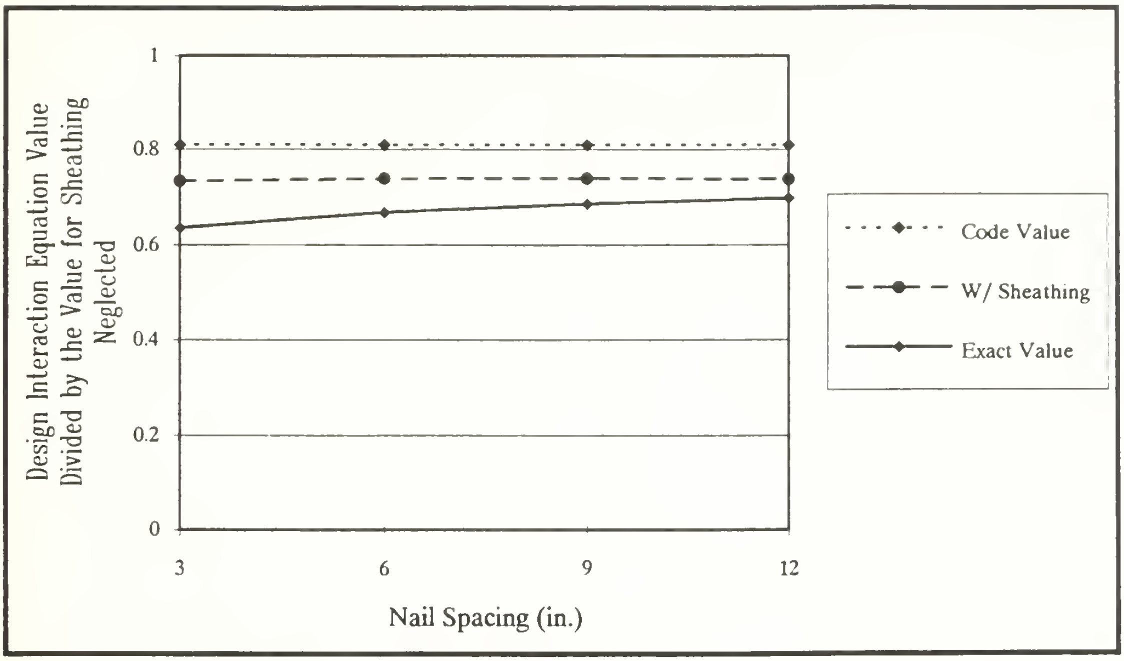


Fig. 3.45 EFFECT OF SPACING OF SHEATHING CONNECTORS ON THE SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 3, MEMBER 11)

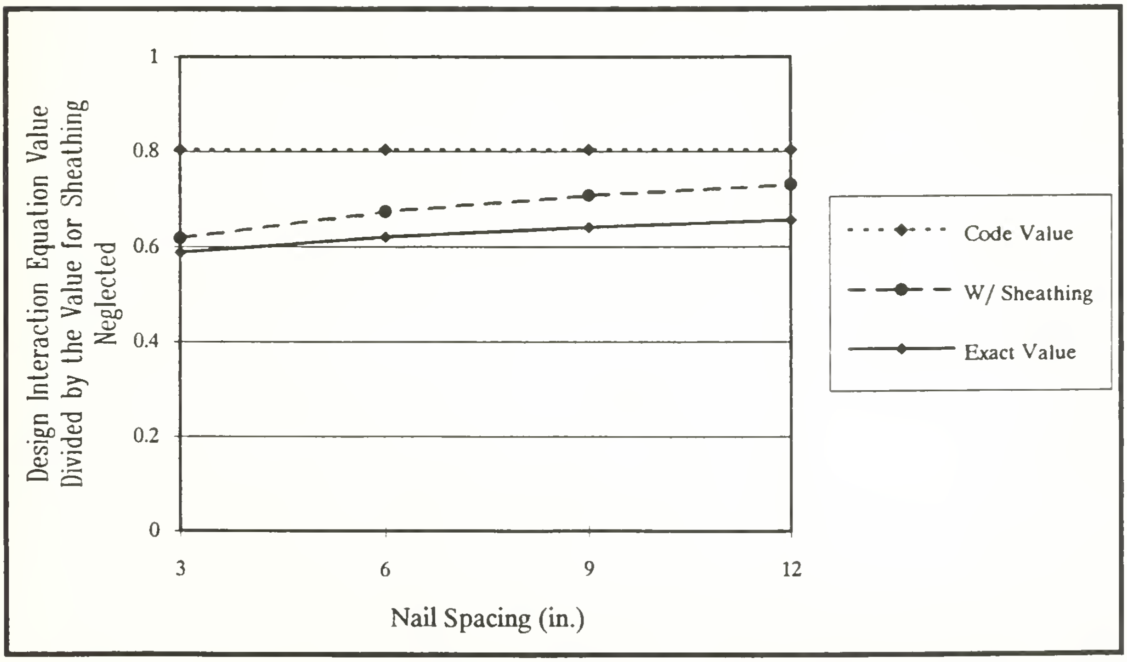


Fig. 3.46 EFFECT OF SPACING OF SHEATHING CONNECTORS ON THE SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 4, MEMBER 5)

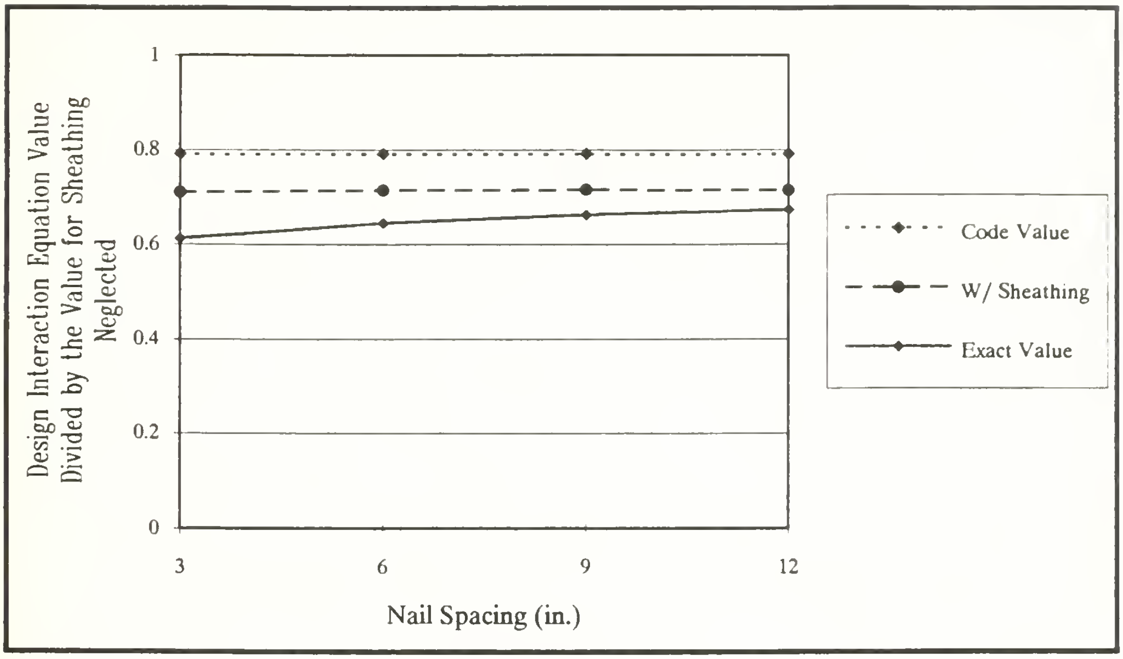


Fig. 3.47 EFFECT OF SPACING OF SHEATHING CONNECTORS ON THE SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 5, MEMBER 10)

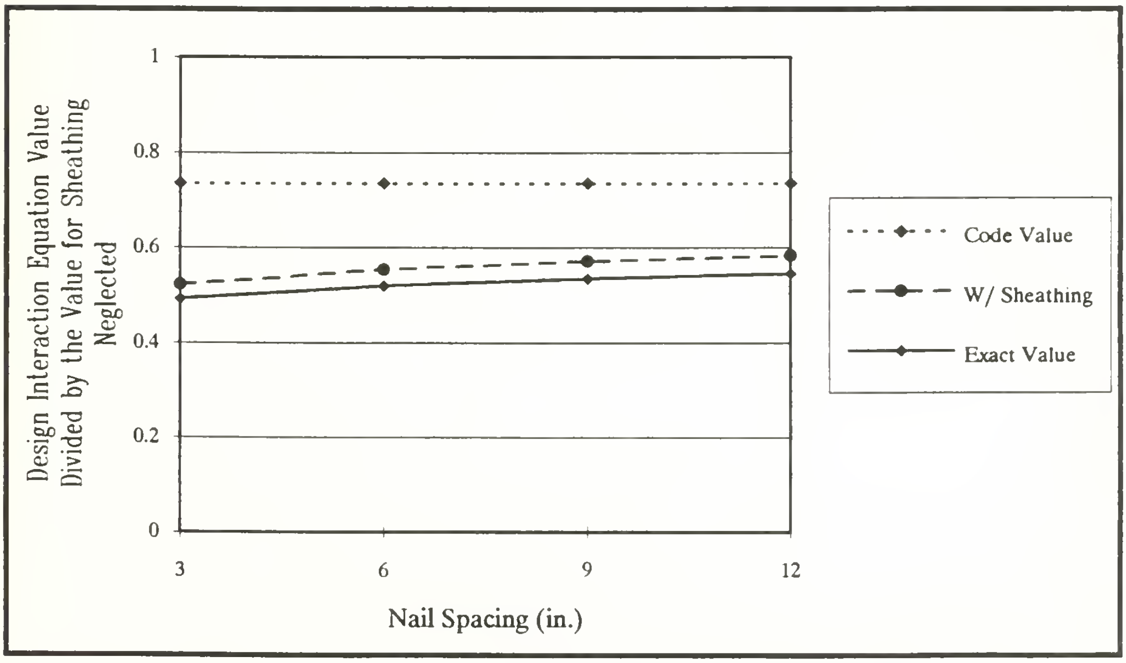


Fig. 3.48 EFFECT OF SPACING OF SHEATHING CONNECTORS ON THE SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 6, MEMBER 13)

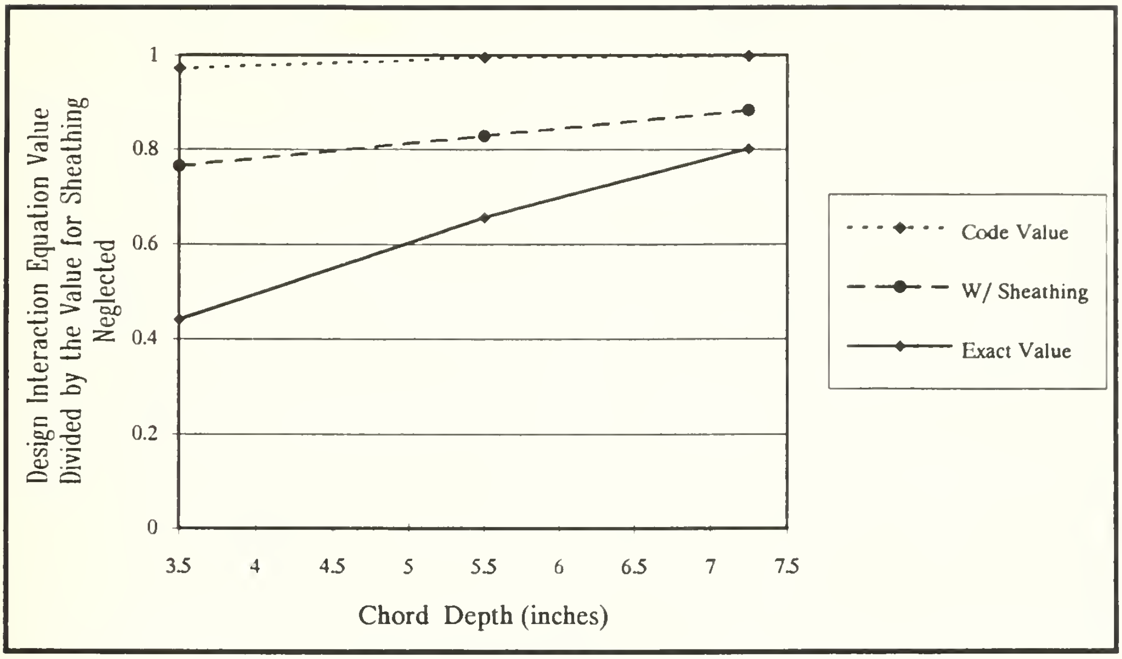


Fig. 3.49 EFFECT OF TRUSS MEMBER DIMENSIONS ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 1, MEMBER 3)

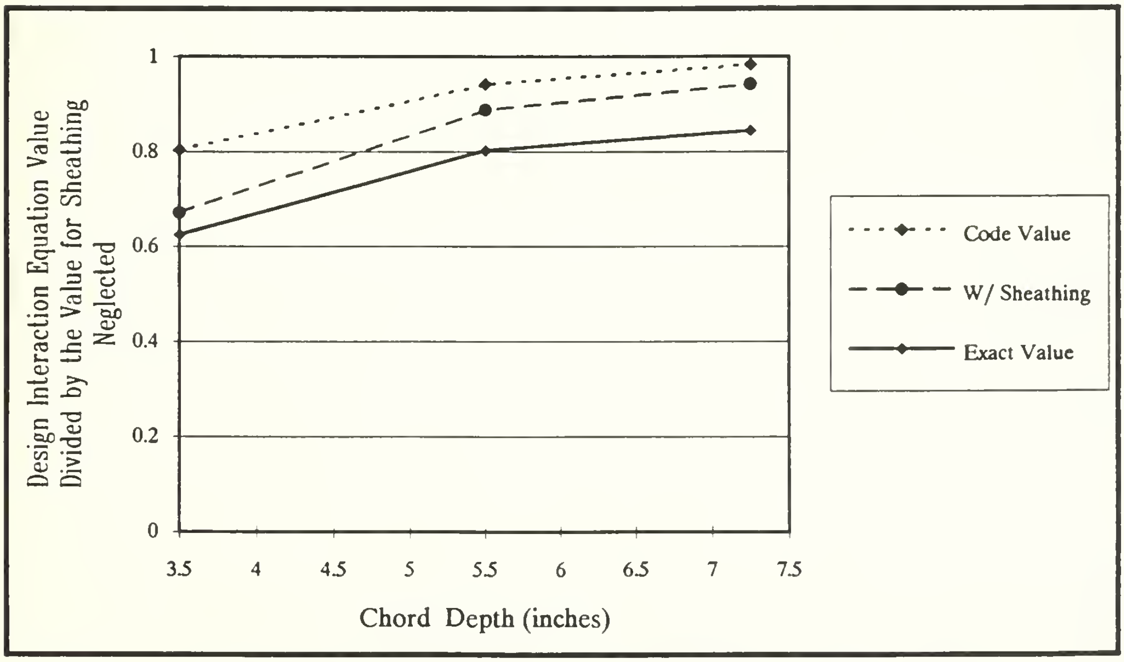


Fig. 3.50 EFFECT OF TRUSS MEMBER DIMENSIONS ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 2, MEMBER 6)

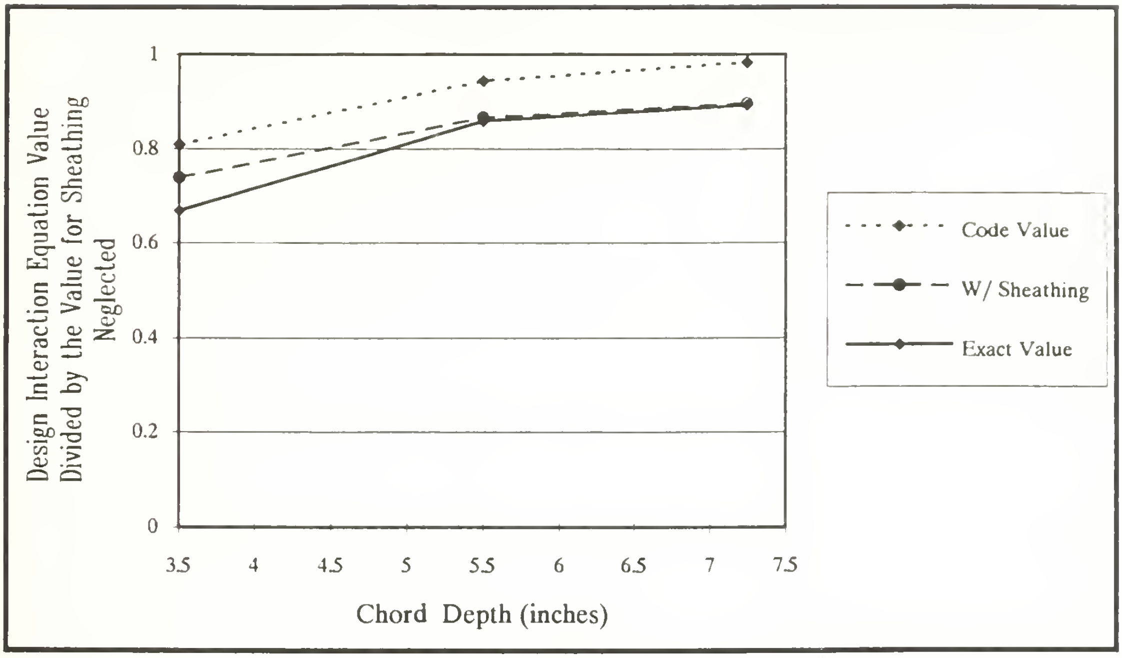


Fig. 3.51 EFFECT OF TRUSS MEMBER DIMENSIONS ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 3, MEMBER 11)

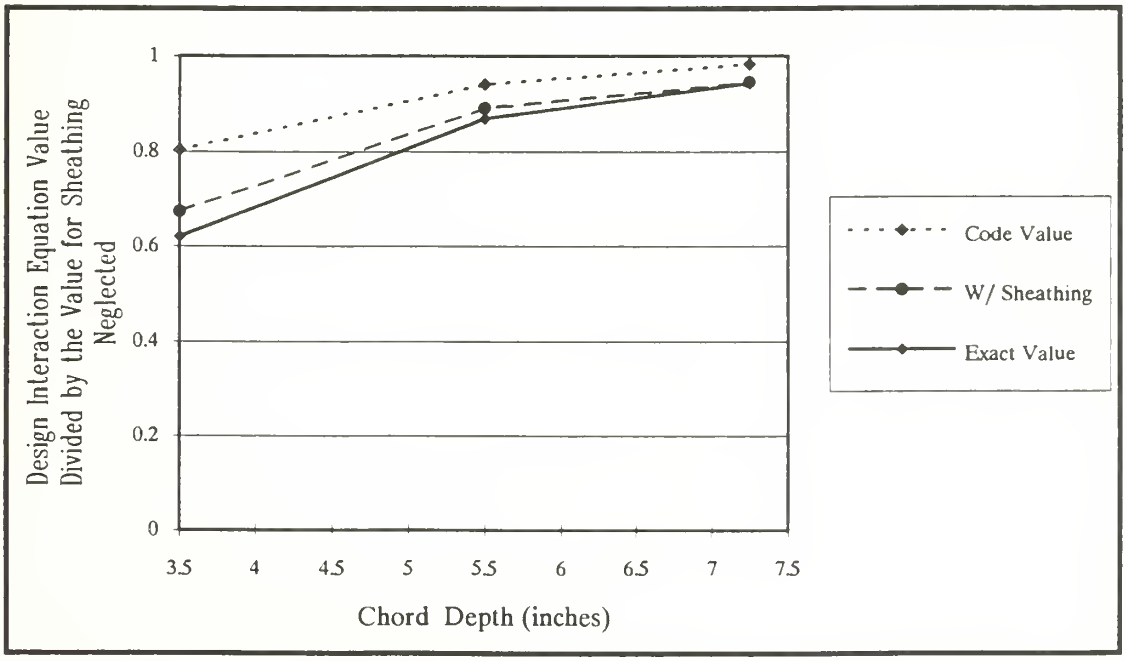


Fig. 3.52 EFFECT OF TRUSS MEMBER DIMENSIONS ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 4, MEMBER 5)

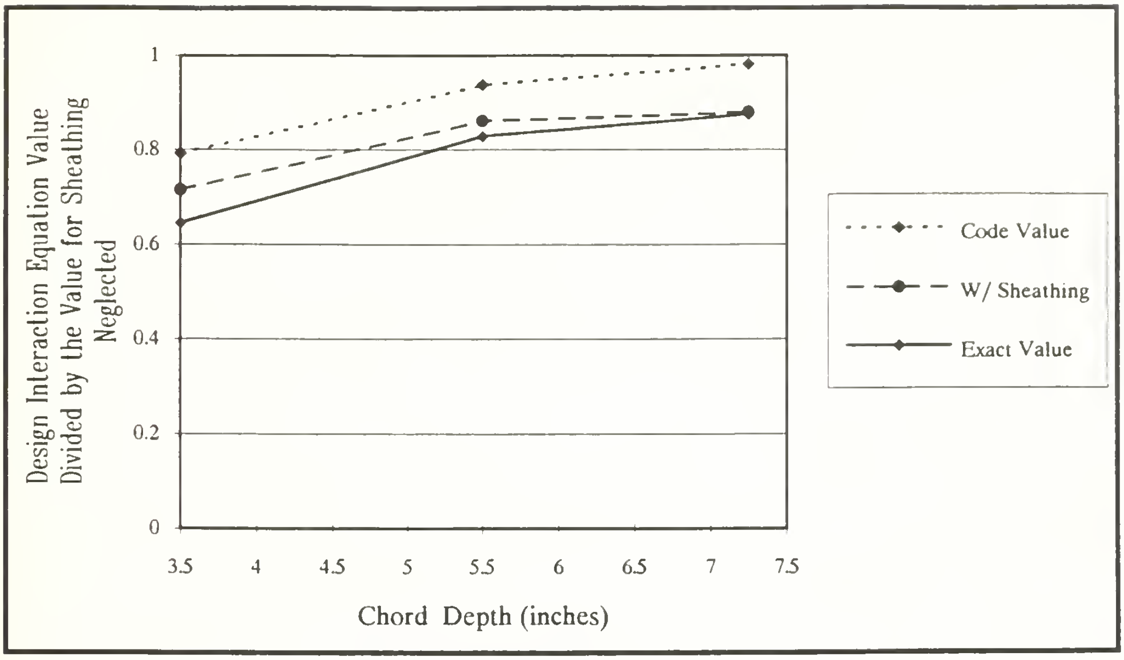


Fig. 3.53 EFFECT OF TRUSS MEMBER DIMENSIONS ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 5, MEMBER 13)

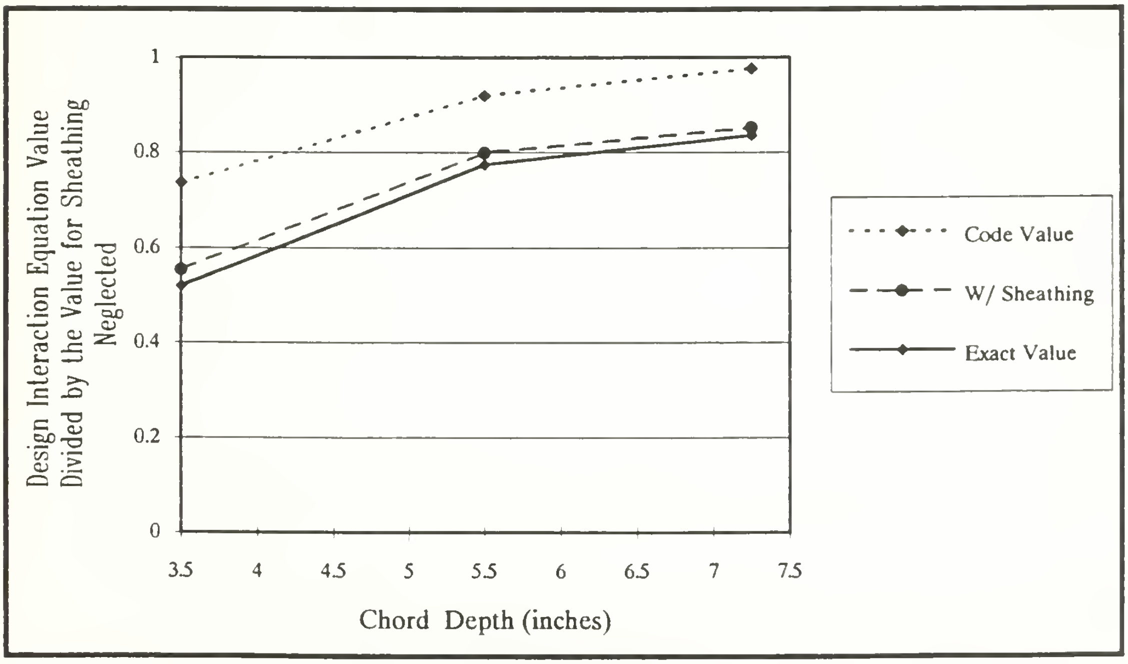


Fig. 3.54 EFFECT OF TRUSS MEMBER DIMENSIONS ON SHEATHING EFFECTIVENESS FOR INTERACTION EQUATION VALUES (TRUSS 6, MEMBER 13)

CHAPTER 4

SUMMARY AND CONCLUSIONS

4.1 Summary

To determine the appropriateness of the current NDS code provisions for including the effects of sheathing in the design of truss compression chords, analysis was conducted on six different truss types by including and neglecting the effects of sheathing in the truss. The analysis used a planar frame finite element analysis computer program, LTRUSS, developed by Jerrett [3]. This program used an eight degree-of-freedom finite element for layered members.

A parametric study was conducted using program LTRUSS to determine the effect which various sheathing and truss properties had on the sheathing's contribution to the strength of the truss. The results of this study are presented graphically and in tabular form relating the parameters to the changes in the interaction equation values for top chord truss members due to the considering the sheathing in the analysis.

Table 4.1 on the following page is a summary of all the data included in the Appendix. This table shows the average sheathing effectiveness values and the variation of the sheathing effectiveness values for truss types and for each of the parameters. There are six values given for each truss and a corresponding varying parameter. These values are defined in Table 4.2.

TABLE 4.1 - Average Sheathing Effectiveness Values and Variation Within Parameters

Parameters / Truss Type	Span	Pitch	E(chord)	A(sheathing)	I(sheathing)	E(sheathing)	Nail Space	Member Size	AVERAGE
	2.3% (3.1)	3.0% (0.6)	3.0% (1.0)	2.8% (0.0)	2.8% (0.0)	2.8% (0.0)	2.8% (0.0)	1.2% (2.6)	*2.6% (0.9)*
1	16.4% (39.5)	17.8% (21.8)	24.2% (3.3)	24.5% (9.1)	23.5% (0.5)	24.2% (4.0)	23.4% (2.9)	17.5% (11.9)	*21.4% (11.6)*
	44.5% (25.9)	52.7% (17.2)	56.8% (17.2)	55.9% (0.8)	55.9% (0.3)	56.0% (0.4)	52.7% (8.0)	36.7% (36.0)	*51.4% (13.2)*
	14.5% (18.4)	16.7% (9.8)	17.8% (7.7)	17.2% (4.9)	17.2% (4.9)	17.2% (4.9)	17.2% (4.9)	7.9% (18.3)	*15.7% (9.2)*
2	27.3% (17.5)	31.5% (8.7)	31.6% (9.4)	31.2% (8.3)	30.7% (4.9)	31.1% (6.1)	30.2% (11.4)	17.5% (27.1)	*28.9% (11.7)*
	32.4% (11.0)	35.4% (10.3)	36.6% (8.1)	36.4% (10.4)	35.6% (4.4)	36.1% (6.7)	35.1% (11.3)	22.5% (25.7)	*33.8% (11.0)*
	18.3% (22.1)	21.5% (10.8)	23.1% 10..0	22.2% (4.9)	22.1% (5.9)	22.1% (5.9)	22.1% (5.9)	10.2% (23.2)	*20.2% (9.8)*
3	29.1% (33.0)	32.8% (22.5)	33.0% (17.4)	32.7% (19.2)	32.0% (14.2)	32.4% (16.1)	31.9% (17.0)	18.3% (33.5)	*30.3% (21.6)*
	36.4% (28.3)	39.6% (15.6)	40.5% (11.9)	40.1% (16.8)	39.2% (10.2)	39.7% (12.4)	38.9% (15.6)	24.1% (32.1)	*37.3% (17.9)*
	15.7% (17.4)	18.1% (7.4)	18.9% (3.2)	18.6% (2.1)	18.6% (2.1)	18.6% (2.1)	18.6% (2.1)	8.6% (18.1)	*17.0% (6.8)*
4	28.7% (18.5)	32.7% (6.0)	32.5% (7.3)	26.7% (6.7)	31.9% (2.0)	31.5% (3.3)	31.4% (11.2)	18.0% (27.2)	*29.2% (10.3)*
	33.1% (11.6)	36.3% (8.3)	36.3% (8.3)	33.3% (9.5)	36.4% (3.6)	36.3% (5.9)	35.9% (10.1)	17.3% (36.2)	*33.1% (11.7)*
	19.3% (21.4)	22.7% (9.2)	24.3% (8.2)	23.4% (4.0)	23.4% (4.0)	23.4% (4.0)	23.4% (4.0)	10.8% (23.1)	*21.3% (9.7)*
5	30.5% (35.8)	34.1% (22.6)	34.4% (17.4)	34.1% (19.8)	33.5% (14.0)	33.9% (16.2)	33.3% (18.7)	19.9% (33.5)	*31.7% (22.3)*
	38.1% (29.0)	41.5% (14.9)	42.2% (11.0)	41.9% (15.6)	41.0% (10.3)	41.6% (12.3)	40.7% (15.5)	26.4% (32.8)	*39.2% (17.7)*
	22.2% (24.7)	26.0% (10.6)	28.0% (9.6)	26.9% (5.1)	26.9% (5.1)	26.9% (5.1)	26.9% (5.1)	12.4% (26.8)	*24.5% (11.5)*
6	36.6% (39.8)	40.7% (23.4)	40.9% (21.5)	40.7% (25.9)	39.9% (17.5)	40.4% (21.0)	39.6% (22.9)	23.2% (43.3)	*37.8% (26.9)*
	43.5% (29.9)	47.3% (15.9)	47.7% (16.1)	47.9% (21.7)	46.9% (13.9)	47.4% (17.1)	46.5% (18.3)	28.8% (39.1)	*44.5% (21.5)*
	15.4% (17.9)	*18.0% (8.1)*	*19.2% (5.0)*	*18.5% (3.5)*	*18.5% (3.7)*	*18.5% (3.7)*	*18.5% (3.7)*	*8.5% (18.7)*	**16.9% (8.0)**
AVERAGE	*28.1% (30.7)*	*31.6% (17.5)*	*32.8% (12.7)*	*31.7% (14.8)*	*31.9% (8.9)*	*32.3% (11.1)*	*31.6% (14.0)*	*19.1% (29.4)*	**29.9% (17.4)**
	38.0% (22.6)	*42.1% (13.7)*	*43.4% (12.1)*	*42.6% (12.5)*	*42.5% (7.1)*	*42.9% (9.1)*	*41.6% (13.1)*	*26.0% (33.7)*	**39.9% (15.5)**

Note: An identification matrix for these values is given in Table 4.2

TABLE 4.2 - Identification of Values Expressed in Table 4.1

AVG. Reduction in IEV from "IEV Neglecting Sheathing" to "IEV Including the use of C_T", expressed as a percent.	Difference between the highest and lowest Sheathing Effectiveness values for this truss type and parameter.
AVG. Reduction in IEV from "IEV Neglecting Sheathing" to "IEV from Analysis Including Sheathing", expressed as a percent.	Difference between the highest and lowest Sheathing Effectiveness values for this truss type and parameter.
AVG. Reduction in IEV from "IEV Neglecting Sheathing" to the "Exact Maximum IEV", expressed as a percent.	Difference between the highest and lowest Sheathing Effectiveness values for this truss type and parameter.

For example, the sheathing effectiveness and variation of the effectiveness for truss type 5 when varying the pitch of the truss is:

22.7%	(9.2)
34.1%	(22.6)
41.5%	(14.9)

This indicates that an average value for the sheathing effectiveness for the "Exact Maximum IEV" is 41.5 percent and that the variation is 14.9 percent. The average sheathing effectiveness value is indicative of the amount of stress reduction which can be expected while the variation is representative of the degree to which this parameter can vary the sheathing effectiveness. Low values

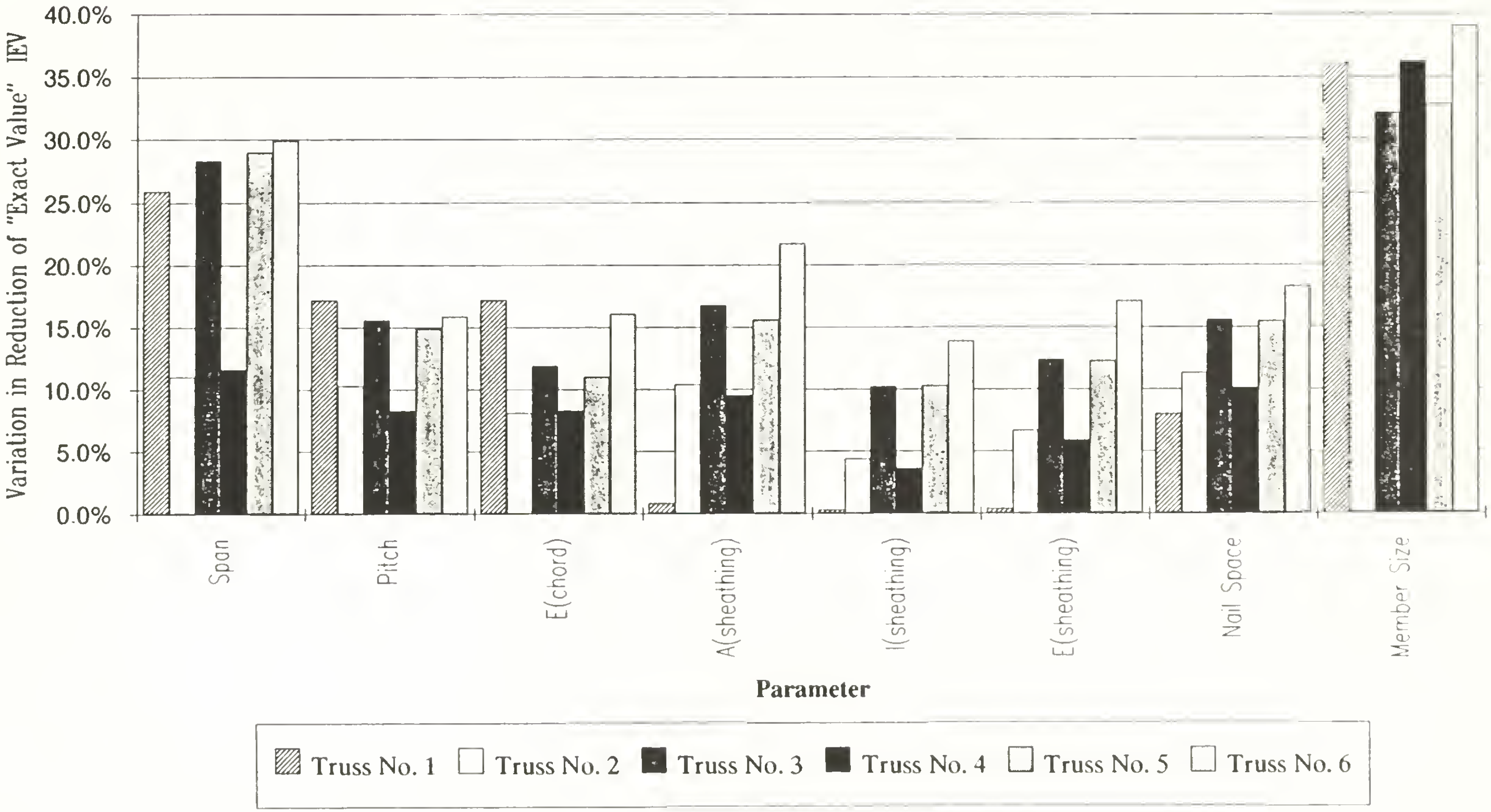
for the variation show that the average sheathing effectiveness remains relatively constant for the given parameter and truss.

The bottom row and right hand column of Table 4.1 show average values for each truss and each parameter, and in the lower right hand corner are the average values for the entire study. From this table the following values are obtained:

1. The average sheathing effectiveness from the "Exact Maximum IEV" is 39.9 percent while the "IEV Including the use of C_T" has an effectiveness of only 16.9 percent. This represents a potential gain of over 130 percent.
2. Truss type 1 shows the greatest potential gain, a possible 19 times what is currently provided for in the design provisions.
3. Of the trusses with two or more top chord members, Truss type 2 shows the greatest potential to benefit from new design provisions, a possible increase of 215 percent.
4. The parameter which has the greatest effect on the sheathing effectiveness is the member size, as a result of it having the largest average variation.

The effect of the various parameters is graphically presented in Figure 4.1 which shows the variation of the sheathing effectiveness for each parameter. This figure

Figure 4.1 - Identification of Parameters With Greatest Contribution to Changes in the IEV



clearly identifies those parameters which should be considered in any revised design provisions. The impact of the various parameters is, in increasing order:

1. Member size
2. Span
3. Truss Type
4. Pitch
5. Nail Spacing
6. Effective area of the sheathing
7. Chord modulus of elasticity
8. Sheathing modulus of elasticity
9. Effective sheathing moment of inertia

4.2 Conclusions

This study confirms the understanding that sheathing attached to the top chord of wood roof trusses will significantly reduce the design interaction equation values in the top chord members. However, it also points out that the current code equation for including the sheathing in the analysis is deficient in reflecting the actual gain in strength due to the addition of the sheathing.

4.3 Recommendations

From this study it can be seen that the current code provisions for including the effect of sheathing on truss members does not come close to duplicating the actual effects. Therefore, it is recommended that a new equation be developed which takes into account the effects of the following parameters:

1. Truss span (span/member ratio);
2. Connector spacing and stiffness;
3. Truss member dimensions;
4. Sheathing effective area and modulus of elasticity; and
5. Truss pitch.

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APPENDIX

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 1								
Base parameters with:								
Span = 10 feet	# 3	0.3103	0.3090	0.43%	0.2094	32.51%	0.1627	47.57%
Span = 15 feet	# 3	0.7300	0.7094	2.82%	0.5576	23.61%	0.3218	55.92%
Span = 20 feet	# 3	1.3784	1.3295	3.55%	1.4740	-6.94%	0.9644	30.03%
Truss Type # 1								
Base parameters with:								
Pitch = 4/12	# 3	0.7100	0.6880	3.10%	0.5167	27.23%	0.2944	58.54%
Pitch = 6/12	# 3	0.7300	0.7094	2.82%	0.5576	23.61%	0.3218	55.92%
Pitch = 8/12	# 3	0.7841	0.7618	2.85%	0.6333	19.23%	0.3440	56.13%
Pitch = 10/12	# 3	0.8610	0.8346	3.07%	0.7467	13.27%	0.4193	51.30%
Pitch = 12/12	# 3	0.9567	0.9242	3.39%	0.9042	5.48%	0.5610	41.36%
Truss Type # 1								
Base parameters with:								
E(chord) = 1200ksi , E(web) = 1000ksi	# 3	0.7300	0.7042	3.54%	0.5405	25.95%	0.2968	59.34%
E(chord) = 1400ksi , E(web) = 1200ksi	# 3	0.7300	0.7071	3.14%	0.5496	24.71%	0.3100	57.53%
E(chord) = 1600ksi , E(web) = 1400ksi	# 3	0.7300	0.7094	2.82%	0.5576	23.61%	0.3218	55.92%
E(chord) = 1800ksi , E(web) = 1600ksi	# 3	0.7300	0.7113	2.56%	0.5649	22.62%	0.3325	54.45%

TABLE A.1 - Comparison of Interaction Equation Values for Truss # 1

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 1								
Base parameters with:								
A = 2.0	# 3	0.7300	0.7094	2.82%	0.5881	19.44%	0.3261	55.33%
A = 3.0	# 3	0.7300	0.7094	2.82%	0.5576	23.61%	0.3218	55.92%
A = 4.0	# 3	0.7300	0.7094	2.82%	0.5368	26.47%	0.3204	56.11%
A = 5.0	# 3	0.7300	0.7094	2.82%	0.5214	28.57%	0.3200	56.17%
Truss Type # 1								
Base parameters with:								
I = 0.016	# 3	0.7300	0.7094	2.82%	0.5598	23.31%	0.3233	55.71%
I = 0.032	# 3	0.7300	0.7094	2.82%	0.5591	23.41%	0.3228	55.78%
I = 0.064	# 3	0.7300	0.7094	2.82%	0.5576	23.61%	0.3218	55.92%
I = 0.096	# 3	0.7300	0.7094	2.82%	0.5562	23.81%	0.3209	56.04%
Truss Type # 1								
Base parameters with:								
E = 1300 ksi	# 3	0.7300	0.7094	2.82%	0.5687	22.09%	0.3232	55.73%
E = 1500 ksi	# 3	0.7300	0.7094	2.82%	0.5576	23.61%	0.3218	55.92%
E = 1700 ksi	# 3	0.7300	0.7094	2.82%	0.5481	24.92%	0.3208	56.06%
E = 1900 ksi	# 3	0.7300	0.7094	2.82%	0.5397	26.07%	0.3201	56.15%

TABLE A.1 - Comparison of Interaction Equation Values for Truss # 1

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 1								
Base parameters with:								
S = 3"	# 3	0.7300	0.7094	2.82%	0.5739	21.39%	0.3243	55.58%
S = 6"	# 3	0.7300	0.7094	2.82%	0.5576	23.61%	0.3218	55.92%
S = 9"	# 3	0.7300	0.7094	2.82%	0.5532	24.22%	0.3558	51.26%
S = 12"	# 3	0.7300	0.7094	2.82%	0.5530	24.25%	0.3804	47.89%
Truss Type # 1								
Base parameters with:								
All 2 x 4 members	# 3	0.7300	0.7094	2.82%	0.5576	23.61%	0.3218	55.92%
All 2 x 6 members	# 3	0.2831	0.2817	0.47%	0.2347	17.10%	0.1861	34.26%
All 2 x 8 members	# 3	0.1665	0.1662	0.18%	0.1470	11.72%	0.1334	19.90%

TABLE A.1 - Comparison of Interaction Equation Values for Truss # 1

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 2								
Base parameters with:								
Span = 20 feet	# 6	0.3702	0.3457	6.61%	0.3012	18.63%	0.2636	28.79%
	# 7	0.3274	0.3115	4.87%	0.2473	24.46%	0.2404	26.58%
Span = 30 feet	# 6	0.9543	0.7671	19.61%	0.6401	32.92%	0.5955	37.60%
	# 7	0.8227	0.7015	14.73%	0.5870	28.65%	0.5447	33.79%
Span = 40 feet	# 6	1.9539	1.4999	23.23%	1.2490	36.08%	1.2490	36.08%
	# 7	1.6338	1.3419	17.87%	1.2536	23.27%	1.1176	31.60%
Truss Type # 2								
Base parameters with:								
Pitch = 4/12	# 6	0.9632	0.7413	23.04%	0.6517	32.34%	0.5739	40.42%
	# 7	0.8011	0.6604	17.57%	0.5620	29.85%	0.4964	38.04%
Pitch = 6/12	# 6	0.9543	0.7671	19.61%	0.6401	32.92%	0.5955	37.60%
	# 7	0.8227	0.7015	14.73%	0.5870	28.65%	0.5447	33.79%
Pitch = 8/12	# 6	1.0101	0.8291	17.92%	0.6637	34.30%	0.6371	36.93%
	# 7	0.8856	0.7655	13.56%	0.6318	28.67%	0.6012	32.12%
Pitch = 10/12	# 6	1.1081	0.9173	17.21%	0.7161	35.37%	0.7011	36.73%
	# 7	0.9789	0.8493	13.24%	0.7011	28.38%	0.6761	30.93%
Pitch = 12/12	# 6	1.2404	1.0289	17.05%	0.7881	36.46%	0.7825	36.92%
	# 7	1.0986	0.9518	13.37%	0.7930	27.81%	0.7678	30.11%

TABLE A.2 - Comparison of Interaction Equation
Values for Truss # 2

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 2								
Base parameters with:								
E(chords) = 1200 ksi, E(webs) = 1000ksi	# 6	0.9540	0.7669	19.61%	0.5973	37.39%	0.5591	41.40%
	# 7	0.8225	0.7014	14.73%	0.5576	32.21%	0.5098	38.02%
E(chords) = 1400 ksi, E(webs) = 1200ksi	# 6	0.9542	0.7670	19.61%	0.6430	32.61%	0.5994	37.18%
	# 7	0.8226	0.7015	14.73%	0.5920	28.04%	0.5444	33.82%
E(chords) = 1600 ksi, E(webs) = 1400ksi	# 6	0.9543	0.7671	19.61%	0.6401	32.92%	0.5955	37.60%
	# 7	0.8227	0.7015	14.73%	0.5870	28.65%	0.5447	33.79%
E(chords) = 1800 ksi, E(webs) = 1600ksi	# 6	0.9543	0.7399	22.46%	0.6428	32.64%	0.5967	37.47%
	# 7	0.8228	0.6836	16.92%	0.5876	28.58%	0.5485	33.34%
Truss Type # 2								
Base parameters with:								
A = 2.0	# 6	0.9543	0.7671	19.61%	0.6532	31.55%	0.6222	34.80%
	# 7	0.8227	0.7015	14.73%	0.6088	26.00%	0.5697	30.75%
A = 3.0	# 6	0.9543	0.7671	19.61%	0.6401	32.92%	0.5955	37.60%
	# 7	0.8227	0.7015	14.73%	0.5870	28.65%	0.5447	33.79%
A = 4.0	# 6	0.9543	0.7671	19.61%	0.6321	33.76%	0.5764	39.60%
	# 7	0.8227	0.7015	14.73%	0.5711	30.58%	0.5267	35.98%
A = 5.0	# 6	0.9543	0.7671	19.61%	0.6268	34.32%	0.5620	41.11%
	# 7	0.8227	0.7015	14.73%	0.5588	32.08%	0.5130	37.65%

TABLE A.2 - Comparison of Interaction Equation Values for Truss # 2

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 2								
Base parameters with:								
I = 0.016	# 6	0.9543	0.7671	19.61%	0.6431	32.61%	0.5988	37.25%
	# 7	0.8227	0.7015	14.73%	0.5904	28.24%	0.5479	33.40%
I = 0.032	# 6	0.9543	0.7671	19.61%	0.6421	32.72%	0.5977	37.36%
	# 7	0.8227	0.7015	14.73%	0.5893	28.38%	0.5468	33.54%
I = 0.064	# 6	0.9543	0.7671	19.61%	0.6401	32.92%	0.5955	37.60%
	# 7	0.8227	0.7015	14.73%	0.5870	28.65%	0.5447	33.79%
I = 0.096	# 6	0.9543	0.7671	19.61%	0.6381	33.13%	0.5933	37.83%
	# 7	0.8227	0.7015	14.73%	0.5848	28.92%	0.5426	34.05%
Truss Type # 2								
Base parameters with:								
E(sheathing) = 1300 ksi	# 6	0.9543	0.7671	19.61%	0.6450	32.41%	0.6056	36.54%
	# 7	0.8227	0.7015	14.73%	0.5954	27.63%	0.5542	32.64%
E(sheathing) = 1500 ksi	# 6	0.9543	0.7671	19.61%	0.6401	32.92%	0.5955	37.60%
	# 7	0.8227	0.7015	14.73%	0.5870	28.65%	0.5447	33.79%
E(sheathing) = 1700 ksi	# 6	0.9543	0.7671	19.61%	0.6359	33.36%	0.5866	38.53%
	# 7	0.8227	0.7015	14.73%	0.5795	29.56%	0.5363	34.81%
E(sheathing) = 1900 ksi	# 6	0.9543	0.7671	19.61%	0.6324	33.73%	0.5787	39.36%
	# 7	0.8227	0.7015	14.73%	0.5728	30.38%	0.5288	35.73%

TABLE A.2 - Comparison of Interaction Equation Values for Truss # 2

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 2								
Base parameters with:								
S = 3"	# 6	0.9543	0.7671	19.61%	0.5867	38.52%	0.5639	40.91%
	# 7	0.8227	0.7015	14.73%	0.5749	30.13%	0.5128	37.67%
S = 6"	# 6	0.9543	0.7671	19.61%	0.6401	32.92%	0.5955	37.60%
	# 7	0.8227	0.7015	14.73%	0.5870	28.65%	0.5447	33.79%
S = 9"	# 6	0.9543	0.7671	19.61%	0.6726	29.52%	0.6157	35.48%
	# 7	0.8227	0.7015	14.73%	0.5941	27.79%	0.5647	31.36%
S = 12"	# 6	0.9543	0.7671	19.61%	0.6949	27.17%	0.6303	33.95%
	# 7	0.8227	0.7015	14.73%	0.5992	27.17%	0.5789	29.64%
Truss Type # 2								
Base parameters with:								
All 2 x 4 members	# 6	0.9543	0.7671	19.61%	0.6401	32.92%	0.5955	37.60%
	# 7	0.8227	0.7015	14.73%	0.5870	28.65%	0.5447	33.79%
All 2 x 6 members	# 6	0.3363	0.3167	5.84%	0.2988	11.16%	0.2702	19.67%
	# 7	0.2972	0.2844	4.32%	0.2537	14.65%	0.2477	16.66%
All 2 x 8 members	# 6	0.1953	0.1919	1.72%	0.1839	5.84%	0.1648	15.62%
	# 7	0.1700	0.1677	1.31%	0.1503	11.54%	0.1497	11.92%

TABLE A.2 - Comparison of Interaction Equation Values for Truss # 2

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 3								
Base Parameters with:								
Span = 30 feet	# 9	0.3818	0.3505	8.20%	0.3176	16.79%	0.2519	34.01%
	# 10	0.3696	0.3418	7.53%	0.2759	25.35%	0.2689	27.24%
	# 11	0.3295	0.3088	6.28%	0.2636	19.99%	0.2534	23.08%
Span = 45 feet	# 9	1.0314	0.7744	24.92%	0.7179	30.40%	0.5997	41.86%
	# 10	0.9454	0.7332	22.45%	0.5695	39.76%	0.5402	42.86%
	# 11	0.8254	0.6680	19.07%	0.6095	26.16%	0.5517	33.16%
Span = 60 feet	# 9	2.2363	1.6016	28.38%	1.4914	33.31%	1.3349	40.31%
	# 10	1.9776	1.4666	25.84%	0.9921	49.84%	0.9616	51.38%
	# 11	1.6868	1.3099	22.34%	1.3487	20.04%	1.1215	33.51%
Truss Type # 3								
Base Parameters with:								
Pitch = 4/12	# 9	1.0792	0.7782	27.89%	0.7478	30.71%	0.5797	46.29%
	# 10	1.0066	0.7467	25.82%	0.6173	38.67%	0.5785	42.53%
	# 11	0.8572	0.6672	22.16%	0.6229	27.33%	0.5566	35.07%
Pitch = 6/12	# 9	1.0314	0.7744	24.92%	0.7179	30.40%	0.5997	41.86%
	# 10	0.9454	0.7332	22.45%	0.5695	39.76%	0.5402	42.86%
	# 11	0.8254	0.6680	19.07%	0.6095	26.16%	0.5517	33.16%

TABLE A.3 - Comparison of Interaction Equation Values for Truss # 3

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Pitch = 8/12	# 9	1.0821	0.8311	23.20%	0.7471	30.96%	0.6482	40.10%
	# 10	0.9843	0.7799	20.77%	0.5717	41.92%	0.5422	44.92%
	# 11	0.8688	0.7154	17.66%	0.6464	25.60%	0.5871	32.42%
Pitch = 10/12	# 9	1.1909	0.9245	22.37%	0.8177	31.34%	0.7279	38.88%
	# 10	1.0783	0.8620	20.06%	0.6038	44.00%	0.5805	46.17%
	# 11	0.9554	0.7915	17.16%	0.7220	24.43%	0.6539	31.56%
Pitch = 12/12	# 9	1.3472	1.0501	22.05%	0.9164	31.98%	0.8139	39.59%
	# 10	1.2147	0.9733	19.87%	0.6622	45.49%	0.6423	47.12%
	# 11	1.0763	0.8918	17.14%	0.8284	23.03%	0.7300	32.17%
Truss Type # 3								
Base Parameters with:								
E(chords) = 1200 ksi, E(webs) = 1000ksi	# 9	1.0312	0.7742	24.92%	0.6832	33.75%	0.5859	43.18%
	# 10	0.9453	0.7331	22.45%	0.5494	41.88%	0.5196	45.03%
	# 11	0.8253	0.6679	19.07%	0.5839	29.25%	0.5403	34.53%
E(chords) = 1400 ksi, E(webs) = 1200ksi	# 9	1.0313	0.7743	24.92%	0.6981	32.31%	0.5742	44.33%
	# 10	0.9454	0.7331	22.45%	0.5594	40.83%	0.5271	44.25%
	# 11	0.8254	0.6680	19.07%	0.6232	24.49%	0.5338	35.32%
E(chords) = 1600 ksi, E(webs) = 1400ksi	# 9	1.0314	0.7744	24.92%	0.7179	30.40%	0.5997	41.86%
	# 10	0.9454	0.7332	22.45%	0.5695	39.76%	0.5402	42.86%
	# 11	0.8254	0.6680	19.07%	0.6095	26.16%	0.5517	33.16%

TABLE A.3 - Comparison of Interaction Equation Values for Truss # 3

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
E(chords) = 1800 ksi, E(webs) = 1600ksi	# 9	1.0315	0.7314	29.09%	0.7070	31.46%	0.5746	44.29%
	# 10	0.9455	0.6986	26.11%	0.5789	38.77%	0.5417	42.71%
	# 11	0.8254	0.6420	22.23%	0.6041	26.82%	0.5362	35.04%
Truss Type # 3								
Base Parameters with:								
A = 2.0	# 9	1.0314	0.7744	24.92%	0.7332	28.91%	0.6432	37.64%
	# 10	0.9454	0.7332	22.45%	0.5894	37.66%	0.5561	41.18%
	# 11	0.8254	0.6680	19.07%	0.6314	23.51%	0.5743	30.42%
A = 3.0	# 9	1.0314	0.7744	24.92%	0.7179	30.40%	0.5997	41.86%
	# 10	0.9454	0.7332	22.45%	0.5695	39.76%	0.5402	42.86%
	# 11	0.8254	0.6680	19.07%	0.6095	26.16%	0.5517	33.16%
A = 4.0	# 9	1.0314	0.7744	24.92%	0.7080	31.35%	0.5681	44.92%
	# 10	0.9454	0.7332	22.45%	0.5539	41.41%	0.5273	44.23%
	# 11	0.8254	0.6680	19.07%	0.5925	28.22%	0.5341	35.29%
A = 5.0	# 9	1.0314	0.7744	24.92%	0.7011	32.02%	0.5440	47.26%
	# 10	0.9454	0.7332	22.45%	0.5413	42.75%	0.5168	45.34%
	# 11	0.8254	0.6680	19.07%	0.5788	29.88%	0.5199	37.01%

TABLE A.3 - Comparison of Interaction Equation Values for Truss # 3

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 3								
Base Parameters with:								
I = 0.016	# 9	1.0314	0.7744	24.92%	0.7207	30.12%	0.6027	41.57%
	# 10	0.9454	0.7332	22.45%	0.5725	39.45%	0.5429	42.58%
	# 11	0.8254	0.6680	19.07%	0.6126	25.78%	0.5546	32.81%
I = 0.032	# 9	1.0314	0.7744	24.92%	0.7198	30.22%	0.6017	41.66%
	# 10	0.9454	0.7332	22.45%	0.5715	39.55%	0.5420	42.67%
	# 11	0.8254	0.6680	19.07%	0.6116	25.90%	0.5536	32.93%
I = 0.064	# 9	1.0314	0.7744	24.92%	0.7179	30.40%	0.5997	41.86%
	# 10	0.9454	0.7332	22.45%	0.5695	39.76%	0.5402	42.86%
	# 11	0.8254	0.6680	19.07%	0.6095	26.16%	0.5517	33.16%
I = 0.096	# 9	1.0314	0.7744	24.92%	0.7159	30.59%	0.5977	42.05%
	# 10	0.9454	0.7332	22.45%	0.5676	39.97%	0.5384	43.05%
	# 11	0.8254	0.6680	19.07%	0.6074	26.42%	0.5497	33.40%
Truss Type # 3								
Base Parameters with:								
E(sheathing) = 1300 ksi	# 9	1.0314	0.7744	24.92%	0.7236	29.84%	0.6158	40.30%
	# 10	0.9454	0.7332	22.45%	0.5774	38.93%	0.5467	42.18%
	# 11	0.8254	0.6680	19.07%	0.6181	25.12%	0.5605	32.09%

TABLE A.3 - Comparison of Interaction Equation Values for Truss # 3

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
E(sheathing) = 1500 ksi	# 9	1.0314	0.7744	24.92%	0.7179	30.40%	0.5997	41.86%
	# 10	0.9454	0.7332	22.45%	0.5695	39.76%	0.5402	42.86%
	# 11	0.8254	0.6680	19.07%	0.6095	26.16%	0.5517	33.16%
E(sheathing) = 1700 ksi	# 9	1.0314	0.7744	24.92%	0.7130	30.88%	0.5854	43.24%
	# 10	0.9454	0.7332	22.45%	0.5623	40.52%	0.5342	43.50%
	# 11	0.8254	0.6680	19.07%	0.6016	27.11%	0.5436	34.14%
E(sheathing) = 1900 ksi	# 9	1.0314	0.7744	24.92%	0.7087	31.29%	0.5726	44.48%
	# 10	0.9454	0.7332	22.45%	0.5557	41.22%	0.5287	44.08%
	# 11	0.8254	0.6680	19.07%	0.5945	27.98%	0.5363	35.03%
Truss Type # 3								
Base Parameters with:								
S = 3"	# 9	1.0314	0.7744	24.92%	0.6807	34.00%	0.5826	43.51%
	# 10	0.9454	0.7332	22.45%	0.5376	43.14%	0.5113	45.92%
	# 11	0.8254	0.6680	19.07%	0.6054	26.66%	0.5241	36.50%
S = 6"	# 9	1.0314	0.7744	24.92%	0.7179	30.40%	0.5997	41.86%
	# 10	0.9454	0.7332	22.45%	0.5695	39.76%	0.5402	42.86%
	# 11	0.8254	0.6680	19.07%	0.6095	26.16%	0.5517	33.16%
S = 9"	# 9	1.0314	0.7744	24.92%	0.7399	28.26%	0.6127	40.60%
	# 10	0.9454	0.7332	22.45%	0.5864	37.98%	0.5553	41.27%
	# 11	0.8254	0.6680	19.07%	0.6096	26.14%	0.5665	31.37%

TABLE A.3 - Comparison of Interaction Equation Values for Truss # 3

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
S = 12"	# 9	1.0314	0.7744	24.92%	0.7553	26.77%	0.6234	39.56%
	# 10	0.9454	0.7332	22.45%	0.5968	36.87%	0.5646	40.28%
	# 11	0.8254	0.6680	19.07%	0.6087	26.26%	0.5755	30.28%
Truss Type # 3								
Base Parameters with:								
All 2 x 4 members	# 9	1.0314	0.7744	24.92%	0.7179	30.40%	0.5997	41.86%
	# 10	0.9454	0.7332	22.45%	0.5695	39.76%	0.5402	42.86%
	# 11	0.8254	0.6680	19.07%	0.6095	26.16%	0.5517	33.16%
All 2 x 6 members	# 9	0.3510	0.3253	7.32%	0.3178	9.45%	0.2685	23.51%
	# 10	0.3381	0.3155	6.69%	0.2823	16.49%	0.2728	19.31%
	# 11	0.3012	0.2843	5.60%	0.2609	13.39%	0.2583	14.24%
All 2 x 8 members	# 9	0.2247	0.2198	2.16%	0.2106	6.27%	0.1866	16.95%
	# 10	0.2078	0.2037	1.97%	0.1826	12.11%	0.1777	14.48%
	# 11	0.1831	0.1801	1.67%	0.1642	10.32%	0.1634	10.77%

TABLE A.3 - Comparison of Interaction Equation Values for Truss # 3

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 4								
Base parameters with:								
Span = 20 feet	# 5	0.3713	0.3467	6.63%	0.3037	18.21%	0.2632	29.11%
	# 6	0.3511	0.3305	5.86%	0.2616	25.49%	0.2583	26.43%
Span = 30 feet	# 5	0.9557	0.7680	19.64%	0.6433	32.69%	0.5926	38.00%
	# 6	0.8945	0.7375	17.55%	0.6144	31.32%	0.5811	35.03%
Span = 40 feet	# 5	1.9558	1.5010	23.25%	1.2377	36.71%	1.2377	36.72%
	# 6	1.8072	1.4277	21.00%	1.3104	27.49%	1.2011	33.54%
Truss Type # 4								
Base parameters with:								
Pitch = 4/12	# 5	0.9707	0.7463	23.12%	0.6620	31.80%	0.5781	40.45%
	# 6	0.8902	0.7063	20.66%	0.5976	32.87%	0.5477	38.47%
Pitch = 6/12	# 5	0.9557	0.7680	19.64%	0.6433	32.69%	0.5926	38.00%
	# 6	0.8945	0.7375	17.55%	0.6144	31.32%	0.5811	35.03%
Pitch = 8/12	# 5	1.0094	0.8284	17.93%	0.6645	34.17%	0.6309	37.50%
	# 6	0.9550	0.8006	16.18%	0.6571	31.20%	0.6333	33.69%
Pitch = 10/12	# 5	1.1061	0.9156	17.22%	0.7160	35.27%	0.6921	37.43%
	# 6	1.0534	0.8878	15.72%	0.7282	30.87%	0.7089	32.70%
Pitch = 12/12	# 5	1.2376	1.0264	17.06%	0.7875	36.37%	0.7708	37.72%
	# 6	1.1835	0.9970	15.76%	0.8245	30.34%	0.8035	32.11%

TABLE A.4 - Comparison of Interaction Equation
Values for Truss # 4

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 4								
Base parameters with:								
E(chords) = 1200 ksi, E(webs) = 1000ksi	# 5	0.9555	0.7679	19.64%	0.6013	37.08%	0.5561	41.80%
	# 6	0.8943	0.7373	17.55%	0.5791	35.25%	0.5447	39.09%
E(chords) = 1400 ksi, E(webs) = 1200ksi	# 5	0.9557	0.7680	19.64%	0.6467	32.33%	0.5959	37.65%
	# 6	0.8944	0.7374	17.55%	0.6185	30.85%	0.5832	34.79%
E(chords) = 1600 ksi, E(webs) = 1400ksi	# 5	0.9557	0.7680	19.64%	0.6433	32.69%	0.5926	38.00%
	# 6	0.8945	0.7375	17.55%	0.6144	31.32%	0.5811	35.03%
E(chords) = 1800 ksi, E(webs) = 1600ksi	# 5	0.9349	0.7408	20.76%	0.6458	30.92%	0.5941	36.45%
	# 6	0.8768	0.7145	18.51%	0.6157	29.78%	0.5834	33.47%
Truss Type # 4								
Base parameters with:								
A = 2.0	# 5	0.9557	0.7680	19.64%	0.6560	31.36%	0.6202	35.11%
	# 6	0.8945	0.7375	17.55%	0.6404	28.41%	0.6075	32.08%
A = 3.0	# 5	0.9557	0.7680	19.64%	0.6433	32.69%	0.5926	38.00%
	# 6	0.8945	0.7375	17.55%	0.6144	31.32%	0.5811	35.03%
A = 4.0	# 5	0.9557	0.7680	19.64%	0.6357	33.49%	0.5728	40.07%
	# 6	0.8945	0.7375	17.55%	0.5953	33.45%	0.5621	37.16%
A = 5.0	# 5	0.9557	0.7680	19.64%	0.6306	34.02%	0.5579	41.63%
	# 6	0.8945	0.7375	17.55%	0.5806	35.09%	0.5476	38.78%

TABLE A.4 - Comparison of Interaction Equation Values for Truss # 4

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 4								
Base parameters with:								
I = 0.016	# 5	0.9557	0.7680	19.64%	0.6463	32.37%	0.5958	37.66%
	# 6	0.8945	0.7375	17.55%	0.6178	30.93%	0.5843	34.68%
I = 0.032	# 5	0.9557	0.7680	19.64%	0.6453	32.48%	0.5947	37.78%
	# 6	0.8945	0.7375	17.55%	0.6166	31.06%	0.5832	34.80%
I = 0.064	# 5	0.9557	0.7680	19.64%	0.6433	32.69%	0.5926	38.00%
	# 6	0.8945	0.7375	17.55%	0.6144	31.32%	0.5811	35.03%
I = 0.096	# 5	0.9557	0.7680	19.64%	0.6413	32.90%	0.5904	38.23%
	# 6	0.8945	0.7375	17.55%	0.6121	31.57%	0.5790	35.27%
Truss Type # 4								
Base parameters with:								
E(sheathing) = 1300 ksi	# 5	0.9557	0.7680	19.64%	0.6481	32.19%	0.6030	36.91%
	# 6	0.8945	0.7375	17.55%	0.6243	30.20%	0.5911	33.92%
E(sheathing) = 1500 ksi	# 5	0.9557	0.7680	19.64%	0.6433	32.69%	0.5926	38.00%
	# 6	0.8945	0.7375	17.55%	0.6144	31.32%	0.5811	35.03%
E(sheathing) = 1700 ksi	# 5	0.9557	0.7680	19.64%	0.6393	33.11%	0.5834	38.96%
	# 6	0.8945	0.7375	17.55%	0.6055	32.30%	0.5722	36.03%
E(sheathing) = 1900 ksi	# 5	0.9557	0.7680	19.64%	0.6359	33.46%	0.5752	39.82%
	# 6	0.8945	0.7375	17.55%	0.5975	33.20%	0.5643	36.91%

TABLE A.4 - Comparison of Interaction Equation Values for Truss # 4

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 4								
Base parameters with:								
S = 3"	# 5	0.9557	0.7680	19.64%	0.5904	38.23%	0.5619	41.21%
	# 6	0.8945	0.7375	17.55%	0.5996	32.96%	0.5483	38.70%
S = 6"	# 5	0.9557	0.7680	19.64%	0.6433	32.69%	0.5926	38.00%
	# 6	0.8945	0.7375	17.55%	0.6144	31.32%	0.5811	35.03%
S = 9"	# 5	0.9557	0.7680	19.64%	0.6755	29.32%	0.6123	35.93%
	# 6	0.8945	0.7375	17.55%	0.6230	30.35%	0.6015	32.75%
S = 12"	# 5	0.9557	0.7680	19.64%	0.6977	27.00%	0.6265	34.45%
	# 6	0.8945	0.7375	17.55%	0.6292	29.66%	0.6160	31.13%
Truss Type # 4								
Base parameters with:								
All 2 x 4 members	# 5	0.9557	0.7680	19.64%	0.6433	32.69%	0.5926	38.00%
	# 6	0.8945	0.7375	17.55%	0.6144	31.32%	0.5811	35.03%
All 2 x 6 members	# 5	0.3375	0.3177	5.87%	0.3008	10.85%	0.2934	13.05%
	# 6	0.3189	0.3024	5.19%	0.2688	15.70%	0.2875	9.85%
All 2 x 8 members	# 5	0.1964	0.1930	1.73%	0.1856	5.46%	0.1850	5.78%
	# 6	0.1840	0.1812	1.55%	0.1626	11.66%	0.1807	1.82%

TABLE A.4 - Comparison of Interaction Equation Values for Truss # 4

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 5								
Base parameters with:								
Span = 30 feet	# 8	0.3826	0.3512	8.21%	0.3194	16.53%	0.2503	34.58%
	# 9	0.3963	0.3637	8.21%	0.2892	27.03%	0.2808	29.14%
	# 10	0.3507	0.3262	6.97%	0.2740	21.87%	0.2628	25.06%
Span = 45 feet	# 8	1.0300	0.7733	24.92%	0.7202	30.08%	0.5939	42.34%
	# 9	1.0280	0.7780	24.33%	0.5962	42.00%	0.5618	45.35%
	# 10	0.8879	0.7020	20.94%	0.6343	28.57%	0.5723	35.55%
Span = 60 feet	# 8	2.2349	1.6007	28.38%	1.4958	33.07%	1.3180	41.03%
	# 9	2.1809	1.5753	27.77%	1.0407	52.28%	1.0021	54.05%
	# 10	1.8373	1.3912	24.28%	1.4124	23.13%	1.1726	36.18%
Truss Type # 5								
Base parameters with:								
Pitch = 4/12	# 8	1.0795	0.7783	27.91%	0.7578	29.80%	0.5823	46.06%
	# 9	1.1049	0.7985	27.73%	0.6491	41.26%	0.6031	45.42%
	# 10	0.9327	0.7074	24.16%	0.6503	30.27%	0.5815	37.65%
Pitch = 6/12	# 8	1.0300	0.7733	24.92%	0.7202	30.08%	0.5939	42.34%
	# 9	1.0280	0.7780	24.33%	0.5962	42.00%	0.5618	45.35%
	# 10	0.8879	0.7020	20.94%	0.6343	28.57%	0.5723	35.55%

TABLE A.5 - Comparison of Interaction Equation Values for Truss # 5

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Pitch = 8/12	# 8	1.0784	0.8283	23.18%	0.7474	30.69%	0.6384	40.80%
	# 9	1.0661	0.8255	22.57%	0.6014	43.59%	0.5627	47.22%
	# 10	0.9304	0.7499	19.40%	0.6724	27.73%	0.6076	34.69%
Pitch = 10/12	# 8	1.1858	0.9208	22.35%	0.8167	31.12%	0.7059	40.47%
	# 9	1.1671	0.9130	21.78%	0.6322	45.83%	0.6043	48.22%
	# 10	1.0222	0.8299	18.81%	0.7521	26.42%	0.6697	34.48%
Pitch = 12/12	# 8	1.3410	1.0455	22.04%	0.9149	31.77%	0.7971	40.56%
	# 9	1.3165	1.0333	21.51%	0.6897	47.61%	0.6670	49.33%
	# 10	1.1527	0.9369	18.72%	0.8648	24.97%	0.7547	34.53%
Truss Type # 5								
Base parameters with:								
E(chords) = 1200 ksi, E(webs) = 1000ksi	# 8	1.0298	0.7732	24.92%	0.6867	33.32%	0.5518	46.42%
	# 9	1.0279	0.7778	24.33%	0.5727	44.28%	0.5496	46.53%
	# 10	0.8878	0.7019	20.94%	0.6050	31.86%	0.5380	39.40%
E(chords) = 1400 ksi, E(webs) = 1200ksi	# 8	1.0299	0.7733	24.92%	0.7011	31.92%	0.5752	44.15%
	# 9	1.0280	0.7779	24.33%	0.5846	43.13%	0.5552	45.99%
	# 10	0.8879	0.7020	20.94%	0.6490	26.91%	0.5560	37.38%
E(chords) = 1600 ksi, E(webs) = 1400ksi	# 8	1.0300	0.7733	24.92%	0.7202	30.08%	0.5939	42.34%
	# 9	1.0280	0.7780	24.33%	0.5962	42.00%	0.5618	45.35%
	# 10	0.8879	0.7020	20.94%	0.6343	28.57%	0.5723	35.55%

TABLE A.5 - Comparison of Interaction Equation Values for Truss # 5

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
E(chords) = 1800 ksi, E(webs) = 1600ksi	# 8	1.0301	0.7303	29.10%	0.7088	31.19%	0.5899	42.73%
	# 9	1.0281	0.7376	28.26%	0.6071	40.95%	0.5685	44.70%
	# 10	0.8880	0.6715	24.37%	0.6287	29.20%	0.5702	35.79%
Truss Type # 5								
Base parameters with:								
A = 2.0	# 8	1.0300	0.7733	24.92%	0.7348	28.66%	0.6383	38.03%
	# 9	1.0280	0.7780	24.33%	0.6226	39.43%	0.5814	43.45%
	# 10	0.8879	0.7020	20.94%	0.6606	25.60%	0.5995	32.48%
A = 3.0	# 8	1.0300	0.7733	24.92%	0.7202	30.08%	0.5939	42.34%
	# 9	1.0280	0.7780	24.33%	0.5962	42.00%	0.5618	45.35%
	# 10	0.8879	0.7020	20.94%	0.6343	28.57%	0.5723	35.55%
A = 4.0	# 8	1.0300	0.7733	24.92%	0.7110	30.97%	0.5618	45.46%
	# 9	1.0280	0.7780	24.33%	0.5772	43.86%	0.5462	46.87%
	# 10	0.8879	0.7020	20.94%	0.6138	30.88%	0.5513	37.91%
A = 5.0	# 8	1.0300	0.7733	24.92%	0.7046	31.59%	0.5373	47.83%
	# 9	1.0280	0.7780	24.33%	0.5618	45.35%	0.5334	48.11%
	# 10	0.8879	0.7020	20.94%	0.5973	32.73%	0.5344	39.81%

TABLE A.5 - Comparison of Interaction Equation
Values for Truss # 5

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 5								
Base parameters with:								
I = 0.016	# 8	1.0300	0.7733	24.92%	0.7231	29.79%	0.5969	42.05%
	# 9	1.0280	0.7780	24.33%	0.5992	41.71%	0.5645	45.09%
	# 10	0.8879	0.7020	20.94%	0.6375	28.21%	0.5753	35.21%
I = 0.032	# 8	1.0300	0.7733	24.92%	0.7222	29.89%	0.5959	42.15%
	# 9	1.0280	0.7780	24.33%	0.5983	41.81%	0.5636	45.18%
	# 10	0.8879	0.7020	20.94%	0.6364	28.33%	0.5743	35.32%
I = 0.064	# 8	1.0300	0.7733	24.92%	0.7202	30.08%	0.5939	42.34%
	# 9	1.0280	0.7780	24.33%	0.5962	42.00%	0.5618	45.35%
	# 10	0.8879	0.7020	20.94%	0.6343	28.57%	0.5723	35.55%
I = 0.096	# 8	1.0300	0.7733	24.92%	0.7183	30.26%	0.5919	42.53%
	# 9	1.0280	0.7780	24.33%	0.5943	42.19%	0.5600	45.53%
	# 10	0.8879	0.7020	20.94%	0.6321	28.81%	0.5704	35.76%
Truss Type # 5								
Base parameters with:								
E(sheathing) = 1300 ksi	# 8	1.0300	0.7733	24.92%	0.7257	29.54%	0.6103	40.75%
	# 9	1.0280	0.7780	24.33%	0.6058	41.07%	0.5696	44.59%
	# 10	0.8879	0.7020	20.94%	0.6445	27.41%	0.5828	34.36%

TABLE A.5 - Comparison of Interaction Equation Values for Truss # 5

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
E(sheathing) = 1500 ksi	# 8	1.0300	0.7733	24.92%	0.7202	30.08%	0.5939	42.34%
	# 9	1.0280	0.7780	24.33%	0.5962	42.00%	0.5618	45.35%
	# 10	0.8879	0.7020	20.94%	0.6343	28.57%	0.5723	35.55%
E(sheathing) = 1700 ksi	# 8	1.0300	0.7733	24.92%	0.7156	30.52%	0.5794	43.75%
	# 9	1.0280	0.7780	24.33%	0.5876	42.85%	0.5547	46.04%
	# 10	0.8879	0.7020	20.94%	0.6249	29.62%	0.5628	36.62%
E(sheathing) = 1900 ksi	# 8	1.0300	0.7733	24.92%	0.7116	30.91%	0.5664	45.01%
	# 9	1.0280	0.7780	24.33%	0.5796	43.62%	0.5481	46.68%
	# 10	0.8879	0.7020	20.94%	0.6164	30.58%	0.5541	37.60%
Truss Type # 5								
Base parameters with:								
S = 3"	# 8	1.0300	0.7733	24.92%	0.6837	33.62%	0.5776	43.92%
	# 9	1.0280	0.7780	24.33%	0.5630	45.24%	0.5325	48.20%
	# 10	0.8879	0.7020	20.94%	0.6302	29.03%	0.5435	38.79%
S = 6"	# 8	1.0300	0.7733	24.92%	0.7202	30.08%	0.5939	42.34%
	# 9	1.0280	0.7780	24.33%	0.5962	42.00%	0.5618	45.35%
	# 10	0.8879	0.7020	20.94%	0.6343	28.57%	0.5723	35.55%
S = 9"	# 8	1.0300	0.7733	24.92%	0.7420	27.96%	0.6065	41.12%
	# 9	1.0280	0.7780	24.33%	0.6141	40.26%	0.5773	43.84%
	# 10	0.8879	0.7020	20.94%	0.6345	28.54%	0.5880	33.78%

TABLE A.5 - Comparison of Interaction Equation Values for Truss # 5

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
S = 12"	# 8	1.0300	0.7733	24.92%	0.7572	26.49%	0.6170	40.10%
	# 9	1.0280	0.7780	24.33%	0.6264	39.07%	0.5870	42.90%
	# 10	0.8879	0.7020	20.94%	0.6337	28.63%	0.5979	32.66%
Truss Type # 5								
Base parameters with:								
All 2 x 4 members	# 8	1.0300	0.7733	24.92%	0.7202	30.08%	0.5939	42.34%
	# 9	1.0280	0.7780	24.33%	0.5962	42.00%	0.5618	45.35%
	# 10	0.8879	0.7020	20.94%	0.6343	28.57%	0.5723	35.55%
All 2 x 6 members	# 8	0.3523	0.3265	7.33%	0.3122	11.38%	0.2607	26.00%
	# 9	0.3625	0.3361	7.29%	0.2927	19.26%	0.2830	21.93%
	# 10	0.3207	0.3008	6.20%	0.2761	13.90%	0.2659	17.09%
All 2 x 8 members	# 8	0.2256	0.2207	2.17%	0.2065	8.45%	0.1774	21.35%
	# 9	0.2235	0.2187	2.13%	0.1924	13.89%	0.1880	15.87%
	# 10	0.1963	0.1927	1.84%	0.1728	11.97%	0.1717	12.54%

TABLE A.5 - Comparison of Interaction Equation Values for Truss # 5

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 6								
Base parameters with:								
Span = 40 feet	# 11	0.4575	0.4139	9.53%	0.3788	17.20%	0.2832	38.10%
	# 12	0.4458	0.4041	9.35%	0.2969	33.39%	0.2854	35.98%
	# 13	0.4383	0.3985	9.07%	0.3091	29.48%	0.2995	31.66%
	# 14	0.3957	0.3637	8.08%	0.2990	24.44%	0.2841	28.20%
Span = 60 feet	# 11	1.2916	0.9182	28.91%	0.8685	32.76%	0.6763	47.64%
	# 12	1.2637	0.9033	28.52%	0.6347	49.78%	0.5976	52.71%
	# 13	1.1619	0.8543	26.48%	0.6435	44.62%	0.6037	48.04%
	# 14	1.0315	0.7855	23.85%	0.6937	32.75%	0.6265	39.27%
Span = 80 feet	# 11	2.8929	1.9452	32.76%	1.8675	35.44%	1.5345	46.96%
	# 12	2.8221	1.9096	32.34%	1.2128	57.03%	1.1836	58.06%
	# 13	2.4995	1.7475	30.09%	1.1525	53.89%	1.1192	55.22%
	# 14	2.1785	1.5818	27.39%	1.5476	28.96%	1.3127	39.74%
Truss Type # 6								
Base parameters with:								
Pitch = 4/12	# 11	1.3733	0.9370	31.77%	0.9337	32.01%	0.6702	51.20%
	# 12	1.3353	0.9169	31.33%	0.6885	48.44%	0.6414	51.97%
	# 13	1.2599	0.8808	30.09%	0.7019	44.29%	0.6445	48.85%
	# 14	1.0941	0.7957	27.27%	0.7163	34.53%	0.6398	41.52%

TABLE A.6 - Comparison of Interaction Equation Values for Truss # 6

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Pitch = 6/12	# 11	1.2916	0.9182	28.91%	0.8685	32.76%	0.6763	47.64%
	# 12	1.2637	0.9033	28.52%	0.6347	49.78%	0.5976	52.71%
	# 13	1.1619	0.8543	26.48%	0.6435	44.62%	0.6037	48.04%
	# 14	1.0315	0.7855	23.85%	0.6937	32.75%	0.6265	39.27%
Pitch = 8/12	# 11	1.3426	0.9794	27.05%	0.8934	33.46%	0.7257	45.95%
	# 12	1.3188	0.9664	26.72%	0.6655	49.54%	0.6320	52.08%
	# 13	1.2000	0.9054	24.55%	0.6379	46.84%	0.6072	49.40%
	# 14	1.0762	0.8381	22.13%	0.7330	31.89%	0.6636	38.34%
Pitch = 10/12	# 11	1.4744	1.0901	26.06%	0.9762	33.79%	0.8030	45.54%
	# 12	1.4522	1.0777	25.79%	0.7144	50.81%	0.6850	52.83%
	# 13	1.3115	1.0015	23.64%	0.6610	49.60%	0.6352	51.57%
	# 14	1.1812	0.9286	21.39%	0.8201	30.57%	0.7319	38.04%
Pitch = 12/12	# 11	1.6707	1.2431	25.59%	1.0979	34.29%	0.9093	45.57%
	# 12	1.6490	1.2307	25.37%	0.7817	52.60%	0.7590	53.97%
	# 13	1.4789	1.1347	23.27%	0.7101	51.98%	0.6831	53.81%
	# 14	1.3334	1.0509	21.19%	0.9443	29.19%	0.8257	38.08%

TABLE A.6 - Comparison of Interaction Equation Values for Truss # 6

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 6								
Base parameters with:								
E(chords) = 1200 ksi, E(webs) = 1000ksi	# 11	1.2913	0.9180	28.91%	0.8270	35.96%	0.6188	52.08%
	# 12	1.2634	0.9031	28.51%	0.5974	52.71%	0.5766	54.36%
	# 13	1.1617	0.8541	26.47%	0.6145	47.10%	0.5884	49.35%
	# 14	1.0313	0.7853	23.85%	0.6562	36.37%	0.5843	43.34%
E(chords) = 1400 ksi, E(webs) = 1200ksi	# 11	1.2915	0.9181	28.91%	0.8442	34.63%	0.6510	49.59%
	# 12	1.2636	0.9032	28.52%	0.6160	51.25%	0.5864	53.59%
	# 13	1.1618	0.8542	26.48%	0.6291	45.85%	0.5954	48.75%
	# 14	1.0314	0.7854	23.85%	0.7092	31.24%	0.6365	38.29%
E(chords) = 1600 ksi, E(webs) = 1400ksi	# 11	1.2916	0.9182	28.91%	0.8685	32.76%	0.6763	47.64%
	# 12	1.2637	0.9033	28.52%	0.6347	49.78%	0.5976	52.71%
	# 13	1.1619	0.8543	26.48%	0.6435	44.62%	0.6037	48.04%
	# 14	1.0315	0.7855	23.85%	0.6937	32.75%	0.6265	39.27%
E(chords) = 1800 ksi, E(webs) = 1600ksi	# 11	1.2917	0.8590	33.50%	0.8514	34.09%	0.6714	48.02%
	# 12	1.2638	0.8460	33.06%	0.6521	48.40%	0.6087	51.83%
	# 13	1.1620	0.8069	30.56%	0.6569	43.47%	0.6119	47.34%
	# 14	1.0316	0.7470	27.59%	0.6886	33.25%	0.6241	39.50%

TABLE A.6 - Comparison of Interaction Equation Values for Truss # 6

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 6								
Base parameters with:								
A = 2.0	# 11	1.2916	0.9182	28.91%	0.8872	31.31%	0.7380	42.86%
	# 12	1.2637	0.9033	28.52%	0.6904	45.36%	0.6450	48.96%
	# 13	1.1619	0.8543	26.48%	0.6771	41.73%	0.6316	45.64%
	# 14	1.0315	0.7855	23.85%	0.7278	29.44%	0.6624	35.79%
A = 3.0	# 11	1.2916	0.9182	28.91%	0.8685	32.76%	0.6763	47.64%
	# 12	1.2637	0.9033	28.52%	0.6347	49.78%	0.5976	52.71%
	# 13	1.1619	0.8543	26.48%	0.6435	44.62%	0.6037	48.04%
	# 14	1.0315	0.7855	23.85%	0.6937	32.75%	0.6265	39.27%
A = 4.0	# 11	1.2916	0.9182	28.91%	0.8566	33.68%	0.6316	51.10%
	# 12	1.2637	0.9033	28.52%	0.5947	52.94%	0.5631	55.44%
	# 13	1.1619	0.8543	26.48%	0.6183	46.79%	0.5825	49.87%
	# 14	1.0315	0.7855	23.85%	0.6675	35.29%	0.5992	41.91%
A = 5.0	# 11	1.2916	0.9182	28.91%	0.8482	34.32%	0.5977	53.72%
	# 12	1.2637	0.9033	28.52%	0.5645	55.33%	0.5367	57.53%
	# 13	1.1619	0.8543	26.48%	0.5984	48.50%	0.5658	51.31%
	# 14	1.0315	0.7855	23.85%	0.6467	37.31%	0.5775	44.02%

TABLE A.6 - Comparison of Interaction Equation Values for Truss # 6

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 6								
Base parameters with:								
I = 0.016	# 11	1.2916	0.9182	28.91%	0.8716	32.52%	0.6793	47.41%
	# 12	1.2637	0.9033	28.52%	0.6378	49.53%	0.6004	52.49%
	# 13	1.1619	0.8543	26.48%	0.6467	44.35%	0.6065	47.80%
	# 14	1.0315	0.7855	23.85%	0.6970	32.43%	0.6295	38.97%
I = 0.032	# 11	1.2916	0.9182	28.91%	0.8705	32.60%	0.6783	47.48%
	# 12	1.2637	0.9033	28.52%	0.6367	49.61%	0.5995	52.56%
	# 13	1.1619	0.8543	26.48%	0.6456	44.44%	0.6056	47.88%
	# 14	1.0315	0.7855	23.85%	0.6959	32.54%	0.6285	39.07%
I = 0.064	# 11	1.2916	0.9182	28.91%	0.8685	32.76%	0.6763	47.64%
	# 12	1.2637	0.9033	28.52%	0.6347	49.78%	0.5976	52.71%
	# 13	1.1619	0.8543	26.48%	0.6435	44.62%	0.6037	48.04%
	# 14	1.0315	0.7855	23.85%	0.6937	32.75%	0.6265	39.27%
I = 0.096	# 11	1.2916	0.9182	28.91%	0.8664	32.92%	0.6743	47.79%
	# 12	1.2637	0.9033	28.52%	0.6326	49.94%	0.5958	52.85%
	# 13	1.1619	0.8543	26.48%	0.6414	44.80%	0.6018	48.21%
	# 14	1.0315	0.7855	23.85%	0.6915	32.97%	0.6245	39.46%

TABLE A.6 - Comparison of Interaction Equation Values for Truss # 6

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 6								
Base parameters with:								
E(sheathing) = 1300 ksi	# 11	1.2916	0.9182	28.91%	0.8754	32.22%	0.6989	45.89%
	# 12	1.2637	0.9033	28.52%	0.6551	48.16%	0.6151	51.32%
	# 13	1.1619	0.8543	26.48%	0.6563	43.52%	0.6143	47.13%
	# 14	1.0315	0.7855	23.85%	0.7068	31.49%	0.6401	37.95%
E(sheathing) = 1500 ksi	# 11	1.2916	0.9182	28.91%	0.8685	32.76%	0.6763	47.64%
	# 12	1.2637	0.9033	28.52%	0.6347	49.78%	0.5976	52.71%
	# 13	1.1619	0.8543	26.48%	0.6435	44.62%	0.6037	48.04%
	# 14	1.0315	0.7855	23.85%	0.6937	32.75%	0.6265	39.27%
E(sheathing) = 1700 ksi	# 11	1.2916	0.9182	28.91%	0.8626	33.21%	0.6563	49.19%
	# 12	1.2637	0.9033	28.52%	0.6167	51.20%	0.5821	53.94%
	# 13	1.1619	0.8543	26.48%	0.6321	45.60%	0.5941	48.87%
	# 14	1.0315	0.7855	23.85%	0.6819	33.90%	0.6142	40.46%
E(sheathing) = 1900 ksi	# 11	1.2916	0.9182	28.91%	0.8575	33.61%	0.6385	50.56%
	# 12	1.2637	0.9033	28.52%	0.6007	52.46%	0.5683	55.03%
	# 13	1.1619	0.8543	26.48%	0.6217	46.49%	0.5854	49.62%
	# 14	1.0315	0.7855	23.85%	0.6711	34.94%	0.6031	41.53%

TABLE A.6 - Comparison of Interaction Equation Values for Truss # 6

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 6								
Base parameters with:								
S = 3"	# 11	1.2916	0.9182	28.91%	0.8256	36.08%	0.6534	49.41%
	# 12	1.2637	0.9033	28.52%	0.6045	52.16%	0.5714	54.78%
	# 13	1.1619	0.8543	26.48%	0.6070	47.76%	0.5717	50.80%
	# 14	1.0315	0.7855	23.85%	0.6874	33.36%	0.5948	42.34%
S = 6"	# 11	1.2916	0.9182	28.91%	0.8685	32.76%	0.6763	47.64%
	# 12	1.2637	0.9033	28.52%	0.6347	49.78%	0.5976	52.71%
	# 13	1.1619	0.8543	26.48%	0.6435	44.62%	0.6037	48.04%
	# 14	1.0315	0.7855	23.85%	0.6937	32.75%	0.6265	39.27%
S = 9"	# 11	1.2916	0.9182	28.91%	0.8951	30.70%	0.6938	46.28%
	# 12	1.2637	0.9033	28.52%	0.6554	48.13%	0.6156	51.28%
	# 13	1.1619	0.8543	26.48%	0.6640	42.85%	0.6218	46.49%
	# 14	1.0315	0.7855	23.85%	0.6957	32.56%	0.6440	37.57%
S = 12"	# 11	1.2916	0.9182	28.91%	0.9141	29.23%	0.7083	45.16%
	# 12	1.2637	0.9033	28.52%	0.6715	46.86%	0.6293	50.20%
	# 13	1.1619	0.8543	26.48%	0.6772	41.72%	0.6336	45.47%
	# 14	1.0315	0.7855	23.85%	0.6964	32.49%	0.6553	36.47%

TABLE A.6 - Comparison of Interaction Equation Values for Truss # 6

IDENTIFICATION OF VARIABLE TRUSS PARAMETER	MBR #	IEV Neglecting Sheathing	IEV Including use of C 't' (Sheathing Neglected)	Percent Reduction from IEV Neglecting Sheathing	IEV from Analysis Including Sheathing	Percent Reduction from IEV Neglecting Sheathing	Exact Maximum IEV (Stresses Corr.)	Percent Reduction from IEV Neglecting Sheathing
Truss Type # 6								
Base parameters with:								
All 2 x 4 members	# 11	1.2916	0.9182	28.91%	0.8685	32.76%	0.6763	47.64%
	# 12	1.2637	0.9033	28.52%	0.6347	49.78%	0.5976	52.71%
	# 13	1.1619	0.8543	26.48%	0.6435	44.62%	0.6037	48.04%
	# 14	1.0315	0.7855	23.85%	0.6937	32.75%	0.6265	39.27%
All 2 x 6 members	# 11	0.4213	0.3854	8.50%	0.3803	9.72%	0.3106	26.27%
	# 12	0.4046	0.3712	8.26%	0.3128	22.68%	0.3041	24.84%
	# 13	0.4004	0.3682	8.04%	0.3200	20.07%	0.3101	22.55%
	# 14	0.3613	0.3354	7.17%	0.3019	16.45%	0.2963	17.99%
All 2 x 8 members	# 11	0.2742	0.2673	2.51%	0.2563	6.51%	0.2256	17.72%
	# 12	0.2422	0.2368	2.25%	0.2046	15.52%	0.1973	18.55%
	# 13	0.2458	0.2401	2.32%	0.2093	14.84%	0.2052	16.51%
	# 14	0.2196	0.2150	2.09%	0.1911	12.99%	0.1898	13.56%

TABLE A.6 - Comparison of Interaction Equation Values for Truss # 6

VITA

Patrick Joseph Gibbons was born in Oklahoma City, Oklahoma, on July 16, 1962, the son of Mary Louise Gibbons and Patrick Joseph Gibbons. After completing his work at Springbrook High School, Silver Spring, Maryland, in 1980, he entered the Georgia Institute of Technology in Atlanta, Georgia. He received the degree of Bachelor of Civil Engineering from Georgia Institute of Technology in August, 1984 and entered the United States Navy that same year. He spent the next six years at various locations around the world working as a Civil Engineer in the Navy's Civil Engineer Corps. In August, 1990, he entered The Graduate School of The University of Texas.

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Thesis
G374 Gibbons
c.1 Interaction equation values for wood truss compression chords considering the effects of partial composite action.